

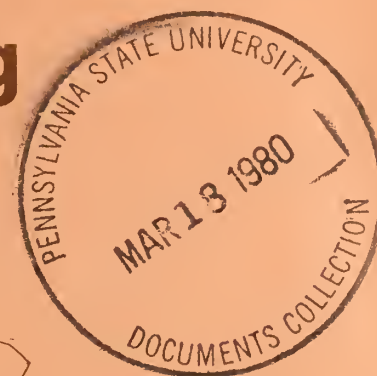
# Appropriate Technology Information

# For Developing Countries:

PB80-117666

## selected abstracts from the NTIS Data File

**Second Edition—November 1979**



**International Technical Information Network,  
a project of the U.S. Agency for International Development.**

# ABOUT NTIS

The National Technical Information Service (NTIS) is an agency within the United States Department of Commerce dedicated to the international exchange of scientific and technical information. It is the largest clearinghouse and dissemination network for U.S. Government-sponsored research and development, and draws upon other public and private information sources throughout the world. The NTIS collection exceeds one million titles, with over 150,000 documents from sources outside the United States.

NTIS operates as a self-supporting public service to store and channel technical information in the public domain. Bibliographic data is maintained on-line and comprehensive listings are printed of all documents in the NTIS collection. The public may quickly locate summaries of interest using on-line search or by consulting various published searches prepared by information specialists at NTIS. The desired documents (in full text) can then be ordered in papercopy or microfiche. NTIS mails about 2,300 information products daily as one of the world's largest processors of specialty information.

As a part of a new initiative to aid economic development, NTIS, under the sponsorship of the U.S. Agency for International Development, has become actively involved in the acquisition and dissemination of appropriate technology information for developing countries.

This joint NTIS/AID international program already consists of a worldwide information network. Some 30 cooperating agencies in developing countries around the world collect technical information, put the documents into the NTIS system, and use NTIS services to meet their own development needs. The NTIS network is a major clearinghouse for the two-way flow of appropriate technology information; a worldwide sharing of technical information which will continue to grow in the future.

For further information about this NTIS/AID program contact:

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# Appropriate Technology Information

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**NTIS**



Prepared by the  
U.S. DEPARTMENT OF COMMERCE  
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UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY  
AGENCY FOR INTERNATIONAL DEVELOPMENT  
WASHINGTON D C 20523

January 4, 1980

Dear Colleague:

The Bureau for Latin America and the Caribbean of the Agency for International Development is proud to introduce this new edition of Appropriate Technology Information for Developing Countries produced by the National Technical Information Service (NTIS) of the Department of Commerce.

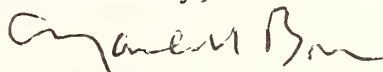
This publication grows out of a regional project, "Science and Technology Information Transfer," and represents a cooperative effort by AID and NTIS with the collaboration of Volunteers in Technical Assistance (VITA).

This edition supersedes the first appropriate technology bibliography entitled, "Selected Appropriate Technologies for Developing Countries" and contains more than a thousand newly-acquired appropriate technology citations recently entered into the NTIS computerized data file.

We trust this new information will be relevant to the needs and available resources of the poor in developing countries.

Most of the information listed is available directly from NTIS and will receive wide dissemination through the AID/NTIS international information network. We hope that you will find the bibliography a useful reference guide and that this information will contribute to the solving of development problems in Latin America and the Caribbean.

Sincerely,




Marshall D. Brown  
Associate Assistant Administrator  
for Development Resources  
Bureau for Latin America  
and the Caribbean





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## INTRODUCTION

This publication, Appropriate Technology Information for Developing Countries was produced to inform the international development community about selected scientific and technical information available from NTIS which can be transferred, adapted, and applied to solve local development problems around the world. The selection was made from the vast NTIS data file, with over one million citations, using a broad definition of "appropriate technology."

The entire question of the appropriateness of a given technology is a much debated and complex issue. Often it is narrowly defined as a small-scale, labor-intensive, low-cost technology which makes maximum use of local skills and resources. The concept of appropriate technology, however, is more sophisticated than the above definition implies. It is more a way of thinking about development problems than an actual set of specific technologies. It requires that development planners not value technology as a positive "good-in-itself" but assess its value in relation to other aspects of life. It requires that the technological problem be considered not solely as an economic problem but must be seen from a larger, more holistic perspective taking into account the multi-leveled needs of human beings. Implicit in the concept is the idea of responsibility to select, modify, and create technical solutions that will improve the actual quality of life with minimal negative impact.

Appropriate technology has become increasingly important in development planning during the 1970's and is now often associated with technologies best suited to meet the basic needs of low-income communities. This linkage grew out of the realization that some of the techniques and solutions being transferred to developing countries were causing serious social and environmental problems, especially among the poor. This has caused

USAID to focus much of its assistance toward helping the lowest income communities in developing countries. From this perspective appropriate technology has been viewed as a technology which is adapted or created to improve directly the quality of life of the low-income groups. This does not refer to "trickle down" benefits but to direct benefits which foster self-reliance and human dignity among the poor.

Taking into account USAID's priority of aiding low income groups, the selections for this publication were made using the following general criteria:

1) Smaller-Scale Technologies

This is exemplified by construction and farm equipment, manufacturing processes and scaled-down industrial plants. Other examples might be a report on a village-level cement plant or information about hand tractors for small farmers.

2) Labor-Intensive Technologies

Reports were chosen about devices and processes which generate employment and rely upon available labor and materials instead of scarce capital for start-up and operation.

3) Low-Cost Technologies

This includes inexpensive and village-level technologies most appropriate for economically marginal groups in both urban and rural areas. Examples include hand pumps, rabbit raising, simple methods of candle manufacturing, etc.

4) Revived Technologies

This refers to products and processes once used in the industrialized countries which may still be economically

beneficial in developing countries. For example, reports have been included on wind mills, certain machine tools, a variety of plant requirements and industry profiles.

5) Improved Traditional Technologies

One example might be ox carts built to traditional dimensions given better tires, wheel bearings, and a suspension system to improve load capacity and durability. Another might be a fishing cooperative based on indigenous management models.

6) Alternatives and Know-How

This includes a broad spectrum of information, from proven age-old practices to modern alternative approaches to problem-solving. An example of this would be the Chinese Barefoot Doctor's Manual, a handbook featuring acupuncture and traditional herbal remedies, as well as modern medical practices.

7) Useful Social and Management Technologies

This involves relevant information on health systems, education, cooperatives, small business administration, etc.

8) Selected Modern Technologies

An appropriate solution to a problem often requires the most sophisticated technology. An example would be the latest agricultural research used to develop a special disease-resistant strain of rice, solar energy used to power a remote radio station, or program planning methods which can be adapted to a developing country context to meet priority needs.

In working with the above outline, we have compiled a broad scope of information which can be appropriate when applied or adapted to specific situations. As previously stated, appropriate technology is not so much a certain kind of technology as a process of choosing and implementing the right solutions



for specific problems. In the last analysis, the appropriateness of the technical information in this publication will ultimately be determined by how well it is adapted and applied to the local context. The responsibility for its creative use must ultimately rest on the wisdom and values of the user.

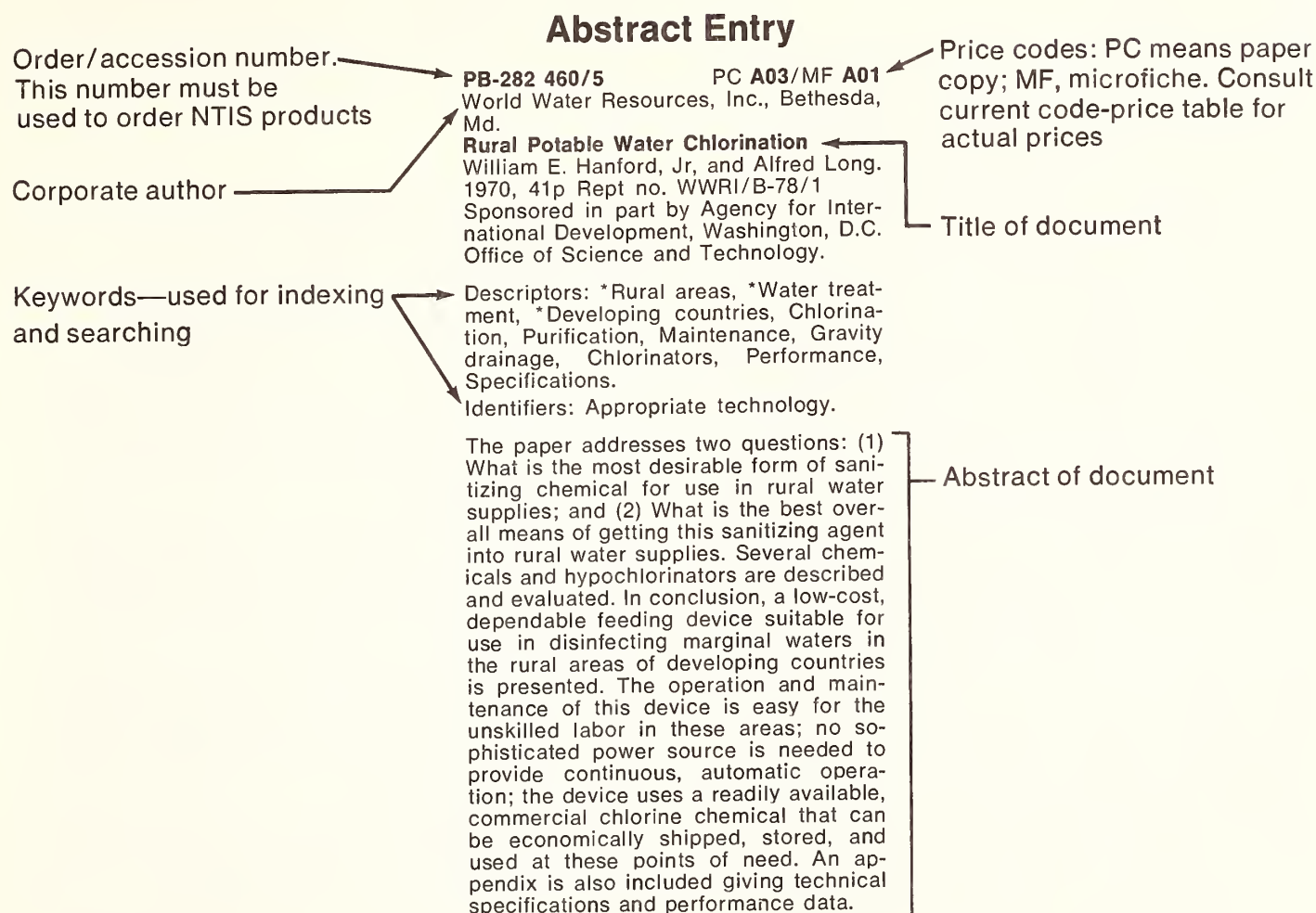
We hope you find these reports helpful and would appreciate hearing any suggestions about how the bibliography might be improved. Please let us know if you find certain documents especially appropriate and useful in your development efforts.

Paul l. Bundick  
Editor

# USERS' GUIDE

The abstracts selected for this publication have been arranged by their NTIS accession number in

alpha-numerical order. This is an example of a typical abstract entry:



To help the user locate the desired information, there are several indexes at the back of the book.

The Subject Index classifies the documents by their key words. Only the starred descriptors and identifiers, however, will appear in the index. The above citation can be found under *\*Rural Areas*, *\*Water Treatment*, and *\*Developing Countries* in the Subject Index. This, unfortunately, limits the usefulness of the index, but space does not permit the cross referencing of the complete set of key words. We suggest looking through all the abstracts to be certain that you locate all the citations in your area of interest.

In addition to the Subject Index, the Corporate Author, and Author indexes reference the organization and person who wrote the report. The above example can be found under *World Water Resources, Inc.* in the Corporate Author Index and under *William E. Hanford* and *Alfred Long* in the Author Index.

Most of the documents in this publication can be ordered in both papercopy and microfiche from NTIS. To order a document, look up the price code listed in the upper right hand corner of each citation (see example above) and follow carefully the ordering instructions on page 383. All documents must be ordered by accession number and *not* by title.

If a document is not available from NTIS, you must contact the source directly to acquire the information. If not available from NTIS, please do not send NTIS the order.

Of special interest to the entrepreneur is the section entitled Industry Profiles. These profiles are a series of professional analyses intended to promote the development of small-scale industry in developing countries. This section has its own subject index and the profiles do *not* appear in any of the three indexes previously mentioned. Please turn to page xii for further information.

# SPECIAL SECTION ON INDUSTRY PROFILES

In 1966 and 1967, the Industry Profiles Program of the United States Agency for International Development published a series of professional analyses intended to promote the growth of industry in developing countries.

Each profile gives basic information on a small- or medium-sized plant in a specific industry. It discusses the features of the industry and its marketing problems, shows the approximate amount of capital needed to establish a plant of specified capacity, and gives an estimate of the annual costs, by categories, of running the plant at full capacity. It also provides a workflow diagram and plant layout as well as supplementary reference information on technical journals, articles, books, patents, and professional services.

Potential entrepreneurs can, by examining the profiles for the industries in which they are interested, take the initial step in deciding whether to embark on particular projects. In some cases the next steps may be simple, in others they may be complicated, requiring full-scale feasibility studies by experts. But whatever the situation, it should be remembered that the profiles are *not* a substitute for the specific studies, whether simple or elaborate, that should precede the actual establishment of new plants.

Before an investment is made in a plant, a feasibility study should be conducted. This may require skilled economic and engineering experience. Here are some questions that must be answered. What is the present demand for the product, and how is it now being satisfied? Will the market absorb the production of the new plant? Will the estimated sales price and quality of the product make it competitive? What is the marketing and distribution plan and to whom will the product be sold? How will the plant be financed? Has a realistic time schedule been developed for construction delivery of equipment, obtaining materials and supplies, training personnel and start-up time for the plant? Have arrangements been made to obtain needed materials and supplies? Are trained personnel available? Do adequate transportation, storage, power, communications, fuel, water, and other facilities exist? Has a sound plant for equipment, design, construction, and operations been developed? Have proper management controls for design, production, quality-control, and other factors been developed? Will the industry fit into the development plans for the area? What will be the social and biological impact? Will the industry be environmentally sound? Most important of all, will the industry contribute to the local quality of life?

Although each profile provides a systematic guide for making cost estimates, profile data has been calculated on the basis of operating experiences and costs in the United States during the late 1960s. Since prices and conditions vary greatly in different countries, these figures must be adapted to local production experience and costs.

## ORDERING INFORMATION FOR INDUSTRY PROFILES

NTIS has 400 Industry Profiles available for purchase. They are listed by subject in alphabetical order beginning on the following page.

The price for each individual Industry Profile is \$3.50 if you live in North America (Mexico, Canada, USA) or have a USAID mission assisting your country. The price is \$7.00 for non-AID countries outside North America.

Complete sets of the 250 Industry Profiles published in 1966, AID-IP-66001 through AID-IP-66250 consecutively, may be purchased for \$190 per set by North Americans and AID countries, or \$380 by non-AID countries.

Complete sets of the 150 Industry Profiles published in 1967, AID-IP-67251 through AID-IP-67400 consecutively may be purchased for \$115 per set by North Americans or AID countries, and \$230 per set for non-AID countries.

After selecting the profiles in the subject areas of interest, find the order number directly to the right of the subject listing (example AID-IP-66202).

Enter this number in the appropriate order form at the back of the book and follow the instructions given on page 383.

To order the complete set of 250 published in 1966, use the order number AID-IP-66-ALL.

To order the complete set of 150 published in 1967, use the order number AID-IP-67-ALL.



## INDUSTRY PROFILE SUBJECT INDEX

Title	Order Number	Number of Pages	Title	Order Number	Number of Pages
<b>A</b>					
Abrasive Wheels . . . . .	AID-IP-66128	7	Bars and Shapes, Steel (15,000 Tons Annually) .	AID-IP-66243	7
Acetylene and Oxygen Bottled . . . . .	AID-IP-67287	6	Bars and Shapes, Steel (30,000 Tons Annually) .	AID-IP-66244	7
Acid, Salicylic . . . . .	AID-IP-66119	6	Baskets, Crates and Hampers . . . . .	AID-IP-66084	5
Acid, Sulfuric . . . . .	AID-IP-66234	6	Bassinets, Baby Beds and Pens . . . . .	AID-IP-66010	5
Adhesive Tape . . . . .	AID-IP-66151	8	Bathrobes . . . . .	AID-IP-67265	5
Agricultural Implements . .	AID-IP-66127	8	Batteries, Automobile . . . .	AID-IP-66152	8
Air Conditioners and Refrigerators . . . . .	AID-IP-66201	8	Batteries, Flashlight and Radio . . . . .	AID-IP-67320	8
Aluminum Architectural Specialties . . . . .	AID-IP-66128	7	Bean Soup, Canned . . . . .	AID-IP-67393	4
Aluminum Cooking Utensils	AID-IP-66129	7	Beans, Dry, Canned . . . . .	AID-IP-67338	4
Aluminum Die Castings . .	AID-IP-66176	7	Beans, Green, Canned . . .	AID-IP-67354	4
Aluminum Foundry . . . . .	AID-IP-67308	7	Beans, Lima, Canned . . . .	AID-IP-67384	4
Aluminum Storm Windows and Doors . . . . .	AID-IP-66202	7	Beans, Wax, Canned . . . .	AID-IP-67340	4
Animal Feed Pellets . . . .	AID-IP-66015	4	Bed Stands, Coffee Tables and End Tables . . . . .	AID-IP-67266	6
Apparel, Nurses' Washable Service . . . . .	AID-IP-67398	5	Bedroom and Dining Room Furniture . . . . .	AID-IP-66043	5
Apple Sauce, Canned . . . .	AID-IP-67356	4	Beds, Baby, Pens and Bassinets . . . . .	AID-IP-66010	5
Apples, Sliced, Canned . .	AID-IP-67334	4	Beef, Canned . . . . .	AID-IP-66231	4
Apricots, Canned . . . . .	AID-IP-67336	4	Beets, Canned . . . . .	AID-IP-67328	4
Artists' Oil Paints . . . . .	AID-IP-67227	8	Beverage Boxes . . . . .	AID-IP-66076	5
Asbestos-Cement Pipe . . .	AID-IP-66177	7	Beverages, Carbonated . .	AID-IP-66001	5
Asbestos-Cement Siding . .	AID-IP-66130	7	Bicycle Tires and Innertubes . . . . .	AID-IP-67350	6
Asparagus, Canned . . . . .	AID-IP-67327	4	Bicycles . . . . .	AID-IP-66153	8
Asparagus Soup, Cream of, Canned . . . . .	AID-IP-67344	4	Billets, Steel . . . . .	AID-IP-66245	7
Asphalt Floor Tile . . . . .	AID-IP-66067	6	Bindery, Book . . . . .	AID-IP-66006	6
Asphalt Paving Material . .	AID-IP-66203	6	Bins, Storage . . . . .	AID-IP-66148	7
Automobile Batteries . . . .	AID-IP-66152	8	Biscuits and Crackers . . .	AID-IP-66011	4
Automobile Mufflers . . . .	AID-IP-66228	8	Blackeyed Peas, Canned .	AID-IP-67341	4
Automobile Tires . . . . .	AID-IP-66229	6	Blackstrap Molasses, Dehydrated . . . . .	AID-IP-67253	4
Automobile Tires and Tubes . . . . .	AID-IP-66230	6	Blinds, Venetian . . . . .	AID-IP-67361	6
Automobile and Truck Leaf Springs . . . . .	AID-IP-66131	7	Block, Concrete . . . . .	AID-IP-66156	7
Automobile and Truck Shock Absorbers . . . . .	AID-IP-67255	8	Blowers, Centrifugal . . . .	AID-IP-66216	8
<b>B</b>			Blueberries, Canned . . . . .	AID-IP-67335	4
Bagasse, Pulp From, For Wallboard . . . . .	AID-IP-66092	6	Board, Fiber . . . . .	AID-IP-66049	6
Bags, Cloth, for Agri- culture Products . . . . .	AID-IP-66155	5	Board, Particle . . . . .	AID-IP-66041	5
Bags, Laundry . . . . .	AID-IP-67306	8	Book Bindery . . . . .	AID-IP-66006	6
Bags, Paper . . . . .	AID-IP-66004	6	Bookcases, Corner Cabinets and Secretaries	AID-IP-67258	5
Bakery . . . . .	AID-IP-66028	4	Books, Printing Shop . . . .	AID-IP-66005	6
Barrels . . . . .	AID-IP-66065	5	Box Springs and Innerspring Mattresses .	AID-IP-67254	6
			Boxes and Shooks . . . . .	AID-IP-66078	5
			Boxes, Beverage . . . . .	AID-IP-66076	5

## INDUSTRY PROFILE SUBJECT INDEX

Title	Order Number	Number of Pages	Title	Order Number	Number of Pages
Boxes, Cardboard and Paper Products .....	AID-IP-66056	6	Cherries .....	AID-IP-67326	4
Boxes, Fiber, Corrugated.	AID-IP-66048	6	Citrus Fruit .....	AID-IP-66061	4
Brake Lining Sets .....	AID-IP-66204	8	Creamed Corn .....	AID-IP-67337	4
Brass Foundry .....	AID-IP-66101	7	Whole Kernel Corn ....	AID-IP-67353	4
Brewers Flakes .....	AID-IP-67293	5	Corn Soup .....	AID-IP-67394	4
Brick and Cement, High Alumina Refractory ....	AID-IP-67314	7	Cranberries .....	AID-IP-67381	4
Bricks, Building .....	AID-IP-66132	7	Fish .....	AID-IP-67304	4
Bricks, Refractory .....	AID-IP-66194	7	Food Processing .....	AID-IP-67388	4
Brief Cases, Leather .....	AID-IP-67275	6	Green Peas .....	AID-IP-67382	4
Broccoli, Canned .....	AID-IP-67391	4	Hominy .....	AID-IP-67330	4
Broiler Production— Poultry Farm .....	AID-IP-67374	4	Kale Greens .....	AID-IP-67390	4
Brooms .....	AID-IP-66154	8	Meat .....	AID-IP-67292	4
Brushes, Paint and Varnish	AID-IP-66166	8	Mushroom Soup .....	AID-IP-67395	4
Buckets, Pails and Pans ..	AID-IP-66103	7	Okra .....	AID-IP-67331	4
Building Hardware .....	AID-IP-66102	7	Onions .....	AID-IP-67355	4
Burlap Cloth from Jute ...	AID-IP-67358	5	Dehydrated Onions ....	AID-IP-67312	4
Buttons, Shell .....	AID-IP-66170	8	Pea Soup .....	AID-IP-67366	4
<b>C</b>			Pork and Beans .....	AID-IP-67367	4
Cabinets, Kitchen .....	AID-IP-66086	5	Pumpkin .....	AID-IP-67352	4
Cabinets, Metal Filing ....	AID-IP-66046	6	Red Raspberries .....	AID-IP-67364	4
Cafeteria and Restaurant Furniture .....	AID-IP-67360	6	Tomato Soup .....	AID-IP-67365	4
Camelback .....	AID-IP-66178	6	Spinach .....	AID-IP-67339	4
Candy and Confectionery .	AID-IP-67368	5	Squash .....	AID-IP-67386	4
Canning			Strawberries .....	AID-IP-67333	4
Apple Sauce .....	AID-IP-67356	4	Sweet Potatoes .....	AID-IP-67332	4
Sliced Apples .....	AID-IP-67334	4	Tomato Juice .....	AID-IP-67392	4
Apricots .....	AID-IP-67336	4	Tomatoes .....	AID-IP-67342	4
Asparagus .....	AID-IP-67327	4	Tuna Fish .....	AID-IP-66232	4
Asparagus Soup .....	AID-IP-67344	4	Orange Juice .....	AID-IP-66090	4
Bean Soup .....	AID-IP-67393	4	Peaches .....	AID-IP-67329	4
Dry Beans .....	AID-IP-67338	4	Pears .....	AID-IP-67357	4
Green Beans .....	AID-IP-67354	4	Pineapples .....	AID-IP-67383	4
Lima Beans .....	AID-IP-67384	4	Plums .....	AID-IP-67387	4
Wax Beans .....	AID-IP-67340	4	Sardines .....	AID-IP-67396	4
Beef .....	AID-IP-66231	4	Canning, Vegetables (Commercial) .....	AID-IP-66223	4
Beets .....	AID-IP-67328	4	Canning, Vegetables (Cooperative) .....	AID-IP-66224	4
Blackeyed Peas .....	AID-IP-67341	4	Carbide .....	AID-IP-66233	6
Blueberries .....	AID-IP-67335	4	Carrots, Canned .....	AID-IP-67389	4
Broccoli .....	AID-IP-67391	4	Cartons, Paper, Corrugated .....	AID-IP-66081	6
Vegetables (Cooperative) .....	AID-IP-66224	4	Carts, Grocery .....	AID-IP-67371	7
Vegetables (Commercial) .....	AID-IP-66223	4	Cassava Starch, Glucose from .....	AID-IP-67313	4
Carrots .....	AID-IP-67389	4	Cast Iron Pipe, Centrifugal .....	AID-IP-66179	7
Cauliflower .....	AID-IP-67351	4	Cast Iron Soil Pipe .....	AID-IP-67260	7
Celery Soup .....	AID-IP-67343	4	Castings, Die, Aluminum..	AID-IP-66176	7
			Castings, Die, Zinc .....	AID-IP-67372	7
			Castor Oil and Meal .....	AID-IP-67269	5



## INDUSTRY PROFILE SUBJECT INDEX

Title	Order Number	Number of Pages	Title	Order Number	Number of Pages
Castor Oil Hydrogenated.	AID-IP-66104	6	Sports Shirts . . . . .	AID-IP-67362	5
Cattle Feed from			Rubber-Soled Fabric		
Manioc Pulp . . . . .	AID-IP-67305	4	Shoes . . . . .	AID-IP-66068	6
Cauliflower, Canned . . . . .	AID-IP-67351	4	Sport Stockings . . . . .	AID-IP-67257	5
Caustic Soda . . . . .	AID-IP-66050	6	Bathrobes . . . . .	AID-IP-67265	5
Celery Soup, Cream of,			Clothing, Women's and		
Canned . . . . .	AID-IP-67343	4	Misses'		
Cement . . . . .	AID-IP-66133	7	Cotton Gingham		
Cement and Brick, High			Dresses . . . . .	AID-IP-67397	5
Alumina Refractory . . . . .	AID-IP-67314	7	Cotton Broadcloth		
Cement, Rubber . . . . .	AID-IP-66118	6	Dresses . . . . .	AID-IP-67267	5
Centrifugal Blowers . . . . .	AID-IP-66216	8	Cotton Dresses . . . . .	AID-IP-66037	5
Ceramic Dinnerware . . . . .	AID-IP-66134	7	Handbags and Leather		
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<b>N</b>			Pans, Buckets and Pails ..	AID-IP-66103	7
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Neon Signs .....	AID-IP-67291	8	Paper Bags .....	AID-IP-66004	6
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Nurses' Washable Service Apparel .....	AID-IP-67398	5	Paper Products and Cardboard Boxes .....	AID-IP-66056	6
Nuts, Assorted, Processed and Packaged .....	AID-IP-67385	5	Paper, Coarse Wrapping, Wood Pulp for .....	AID-IP-66097	6
<b>O</b>			Paper, Wrapping, Coarse (6,000 Tons Annually) ..	AID-IP-66079	6
Oil, Lemon .....	AID-IP-66218	6	Paper, Wrapping, Coarse (12,500 Tons Annually).	AID-IP-66080	6
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Oil, Olive, Crude .....	AID-IP-66085	5	Pattern Making Foundry ..	AID-IP-67309	8
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			Pineapple, Sliced, Canned	AID-IP-67383	4
			Pins, Straight .....	AID-IP-66249	8



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Pipe, Cast Iron, Centrifugal	AID-IP-66179	7			
Pipe, Concrete .....	AID-IP-66157	7	<b>R</b>		
Pipe, Soil, Cast Iron .....	AID-IP-67260	7	Radio and Flashlight Batteries .....	AID-IP-67320	8
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Stretch Socks for Men and Children .....	AID-IP-67251	5	Truck and Automobile Leaf Springs .....	AID-IP-66131	7
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Suits, Women and Misses.	AID-IP-67369	5	Truck Mufflers .....	AID-IP-66174	8
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Potato Flakes .....	AID-IP-66167	4	Work Gloves .....	AID-IP-66024	5
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Squash .....	AID-IP-67386	4	Wrapping Paper, Coarse		
Sweet Potatoes .....	AID-IP-67332	4	(6,000 Tons Annually) .	AID-IP-66079	6
Tomato Juice .....	AID-IP-67392	4	Wrapping Paper, Coarse		
Tomatoes .....	AID-IP-67342	4	(12,500 Tons Annually) .	AID-IP-66080	6
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			Yarn, Cotton (Small Plant)	AID-IP-66238	5
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# APPROPRIATE TECHNOLOGY ABSTRACTS

**AD-A002 212/9** PC A02/MF A01  
Rand Corp Santa Monica Calif  
**Fuel from Organic Matter: Possibilities for the State of California**  
Doris J. Dugas. Oct 73, 20p Rept no. P-5107

Descriptors: \*Energy conversion, \*California, \*Fuels, Methane, Organic materials, Forests, Farm crops, Wastes(Industrial), Solid wastes, Urban areas, Quantities, Cost estimates, Industries, Food processing, Lumber, Sewage.  
Identifiers: Agricultural wastes, Waste disposal, \*Solid waste disposal, Refuse.

This study investigates the amounts of organic material that might be made available for energy purposes in the State of California, its potential fuel value, and the estimated cost. Sources of organic material that are considered are: (1) crops grown specifically for energy, (2) natural forests, and (3) wastes from the urban, agricultural, and industrial sectors.

**AD-A003 909/9** PC E02/MF A01  
Naval Research Lab Washington D C  
**Corrosion of Metals in Tropical Environments: Part 10 - Final Report of Sixteen-Year Exposures**  
Final rept.  
C. R. Southwell, and J. D. Bultman. 2 Jan 75, 41 Rept no. NRL-7834  
See also Part 9, AD-687 705.

Descriptors: \*Corrosion, \*Tropical tests, Sea water, Fresh water, Tables(Data).

A comprehensive long-term investigation of corrosion of 52 metals immersed in seawater and in fresh water, suspended at mean-tide level, and exposed to marine and inland tropical atmospheres has been completed for exposure periods of up to 16 years. A series of reports on specific metal groups has already been published. This is a final report on the project; it presents tabulated results for all metal-environment combinations included in the study, both for simple plates and bimetallic couples. Many of these are previously unreported data. Time-corrosion curves for all single-metal exposures not previously reported on to completion are included; these are for 16 wrought and cast ferrous metals in two atmospheres and 7 nonferrous metals in all five environments. Because of their basic value for comparing corrosiveness of environments and for evaluating effectiveness of alloys, curves for all the commercially pure metals are presented for all five environments. The final steady-state corrosion rate is a most useful value for estimating expected metal life; this value (R sub c) has been established for most metals in each environment and is included with all curves and tabulated data.

**AD-A004 254/9** PC A05/MF A01  
Naval Postgraduate School Monterey Calif  
**Factors Effecting the Fatigue Strength of Ferro-Cement**  
Master's thesis  
David P. Sargent, Jr. Dec 74, 89p

Descriptors: \*Reinforced concrete, \*Fatigue(Mechanics), Wire, Orientation(Direction), Impregnation, Cements, Fatigue tests(Mechanics), Stresses, Theses.  
Identifiers: \*Ferrocement.

Ferro-cement is a composite material consisting of multiple layers of wire mesh impregnated with a cement mortar. Steel rods may be sandwiched in the center to give added strength, and to shape the mesh before application of the mortar. Selection of materials can vary considerably. Investigation of the influence of wire orientation on the fatigue strength of ferro-cement was undertaken in this study. Tests were also conducted to determine the effect on fatigue life of voids in the specimens caused by poor penetration of the mortar.

**AD-A007 918/6** PC A02/MF A01  
Forest Products Lab Madison Wis  
**Recovery and Reuse of Wastepaper from Shredded Household Trash**  
Forest Service research paper

James F. Laundrie. 1975, 14p Rept no. FSRP-FPL-252

Descriptors: \*Waste disposal, \*Reclamation, \*Paper, Separation, Thermoplastic resins, Films.  
Identifiers: Waste recycling, Waste papers, \*Refuse disposal, Recycled paper, Shredding, Classifiers, Sorting.

The report describes the research and development of the dry process originated at the Forest Products Laboratory for separating wastepaper from shredded household trash. The process, based on air classification, provides for removal of thermoplastic films. It also permits separation of the wastepaper by grade. Indications are that the recovered paper can be used successfully in a variety of products.

**AD-A008 453/3** PC A04/MF A01  
Asian Inst of Tech Bangkok (Thailand)  
**The Reclamation of Drinking Water from Sewage**  
Annual rept. 1 Jan-31 Dec 72  
M. G. McGarry. 4 Feb 75, 74p ARDG(FE)-472-2  
Grant DA-RDRF-S92-544-72-G181

Descriptors: \*Water treatment, \*Drinking water, \*Water reclamation, Waste water, Arid land, Nitrogen, Algae, Photosynthesis, Activated carbon, Filtration, Thailand.  
Identifiers: \*Waste water reuse, Potable water, Chemical removal(Water treatment), Harvesting of algae, Aeration ponds, Lagoons(Ponds), Activated carbon treatment, Water pollution control.

Indirect reuse of wastewaters in drinking water supplies is common practice in industrialized states today. The investigations reported upon have been directed towards improvements upon existing techniques more applicable to the tropical and savanna developing country. High costs and technical difficulties have been encountered in the removal of nitrogen and low level organics. In this study, investigations have been conducted into nitrogen stripping by photosynthetic algal growth, using the nitrogen as a nutrient with subsequent algae harvest from ponds, and low level organics reduction by (a) powdered activated carbon treatment and (b) semi-rapid filtration. Several processes including high rate treatment oxidation ponds, dissolved air flotation, roughing filtration, photosynthetic nitrogen stripping ponds, powdered activated carbon adsorption, dual-media filtration and chlorination were developed and specifically applied to domestic wastewater reclamation for drinking water. These were incorporated into two process streams, one using activated carbon for low level organics removal and the other semi-rapid filtration.

**AD-A009 306/2** PC A07/MF A01  
Rand Corp Santa Monica Calif  
**Analyzing the Use of Technology to Upgrade Education in a Developing Country**  
Research memo.  
Margaret B. Carpenter, L. G. Chesler, H. S. Dordick, and Sue A. Haggart. Mar 70, 147p Rept no. RM-6179-RC

Descriptors: \*Teaching methods, \*Instructional materials, Technology, Schools, Education, Television systems, Cost analysis, Instructors, Colombia.  
Identifiers: Developing countries.

The memorandum describes an application of the techniques of system analysis to educational planning. Particular emphasis is placed on evaluating the usefulness of technology in education, especially television. In contrast to most analyses of educational technology, the present study (1) considers the technology as it interrelates with the entire educational system in which it is to function, and (2) proposes alternative means to attain similar improvements in that system. By comparing the cost of alternative ways to attain similar improvements, the study shows that the cost of technological improvements is approximately the same as that of improvements achieved through more conventional means.

**AD-A010 976/9** PC A03/MF A01  
Rand Corp Santa Monica Calif

**A Housing Services Policy for Low-Income Urban Families in Underdeveloped Countries**  
Georges Vernez. Dec 74, 26p Rept no. P-5328

Descriptors: \*Housing(Dwellings), \*Underdeveloped areas, \*Nations, Marketing, Policies, Construction, Urban areas, Finance, Management planning and control, Classification.  
Identifiers: \*Developing countries, \*Squatter communities, Services, Low income families.

Housing policies for urban low-income families in underdeveloped countries have typically stressed the public supply of fully serviced standard housing units, but these policies are mostly unsuccessful. In practice, a large proportion of the demand for shelter has been overflowing into so-called squatter settlements that are developing at the periphery of most large sized cities of the emerging nations. The paper discusses a housing services policy which promises to be effective for these families. The financial component of the policy is studied.

**AD-A012 733/2** PC A07/MF A01  
Urban Innovations Group Los Angeles Calif  
**A Review of Architectural Methods and Their Effectiveness for Communicating Human Requirements**  
Final rept.  
Michael E. Durkin. Jun 75, 148p CERL-TR-D-54  
Contract DACA88-74-C-0032

Descriptors: \*Requirements, \*Human factors engineering, \*Architecture, Buildings, Construction, Standards, Specifications, Symbols, Graphics.  
Identifiers: Notation systems.

Available methods for organizing and communicating human requirement information during the building delivery process are reviewed. Included are methods for collecting human information, communicating human information through the use of written documents, and the generation of human requirement information through the direct involvement of users in the architectural design process. Each method is briefly described. Its applicability to particular phases of the building delivery process is noted. Its ability to include requirement information is discussed. Advantages and disadvantages are listed. Current usage information is provided, when available. An in-depth analysis of examples of communication of human standards via written documents is also provided. (Author)

**AD-A013 482/5** PC A05/MF A01  
Naval Postgraduate School Monterey Calif  
**The Effects of Precycling on the Strength of Ferrocement**  
Master's thesis  
Earle Stanley Babcock. Jun 75, 90p

Descriptors: \*Reinforced concrete, \*Fatigue(Mechanics), Fatigue tests(Mechanics), Wire, Stresses, Cyclic tests, Tensile properties, Bending stress, Theses.  
Identifiers: \*Ferrocement.

Ferrocement is a composite material made up of cement mortar reinforced with a mesh of steel wire. Its non-homogeneity results in material characteristics which are peculiarly its own. In this study, the ferrocement specimens tested varied in the type of wire reinforcement used, as well as in the water content of the mortar. Stress versus cycles to failure curves were developed, and comparisons were made between the curves of different types of specimens. Bending and tensile strength tests were conducted after cyclic loading in order to gain insights on the effects of precycling. Finally, some comparisons were made which related the data from this thesis to that of several preceding studies.

**AD-A015 226/4** PC A02/MF A01  
Naval Medical Research Inst Bethesda Md  
**Schistosomiasis and 'Schistosoma Mansonii'**  
Medical research progress rept.  
Margaret A. Stirewalt, and C. H. Dorsey. 1973, 16p  
Availability: Pub. in U.S. Navy Medicine Jnl. v61 p5-19 Apr 73.



## APPROPRIATE TECHNOLOGY ABSTRACTS

Descriptors: \*Schistosoma mansonii, \*Cercariae, Schistosomiasis, Hosts(Biology), Skin(Anatomy), Penetration, Life cycles, Vertebrates, Humans, Epidemiology, Reprints.

This paper is concerned largely with the background information necessary to the development of a study on the skin penetration mechanisms used by cercariae in their infection of vertebrate hosts, including man. The author touched briefly upon the disease -- its importance, distribution, course in man, epidemiology, and control; the life history of the parasite; and pertinent aspects of the structure of skin and the schistosome cercaria. In a subsequent report, the cercarial penetration mechanisms will be presented.

**AD-A015 426/0** PC A08/MF A01  
Army Tropic Test Center Apo New York 09827  
**Materiel Testing in the Tropics**  
4th ed.  
Jun 75, 167p Rept no. USATTC-7503001

Descriptors: \*Environmental tests, \*Tropical regions, \*Materiel, Handbooks, Degradation, Climate, Computerized simulation, Geology, Vegetation, Biodeterioration, Herbicides, Elastomers, Plastics, Textiles, Electronic equipment, Optical equipment, Leather, Acoustics, Human factors engineering, Seismology, Radio transmission, Ground vehicles, Panama.  
Identifiers: Canal zone.

The US Army Tropic Test Center (USATTC) presents the 1975 update of Tropic Environmental Effects, retitled Materiel Testing in the Tropics. The handbook is a compendium of the US Army's experience in testing equipment in the humid tropics. Sources of information are tropic materiel tests, test methodology investigations, personal experiences, open literature, Department of Defense reports, and voluntary contributions from many scientists and engineers outside of USATTC. The document is the US Army's unofficial corporate memory of tropic materiel testing. Topics covered include the Panama Canal Zone environment, history of tropic tests, degrading environmental factors, materiel degradation, tropic reliability and maintainability, vehicular mobility testing, sound, visibility, and radio propagation, human factors engineering, working in the jungle, man-pack protability and computerized test site selection methods.

**AD-A016 147/1** PC E02/MF A01  
Army Engineer Waterways Experiment Station  
Vicksburg Miss  
**Protection of Slopes Against Rainfall Erosion**  
Final rept. Jul 74-Jun 75  
Edward B. Perry. Sep 75, 41

Descriptors: \*Soil erosion, \*Rainfall, \*Slopes, Construction, Soil mechanics, Simulators, Soil stabilization, Runoff, Test methods, Protection, Effectiveness, Sprays.  
Identifiers: Slope stability.

Commercially available spray-on stabilizers are represented as being capable of controlling soil erosion between the time of slope construction and establishment of a vegetative cover. This study presents a review of previous research on rainfall erosion process, mechanics of rainfall erosion, characteristics of natural rainfall, rainfall simulators, studies of rainfall erosion of soils and studies of rainfall erosion of laboratory rainfall simulator.

**AD-A019 542/0** PC A07/MF A01  
Wisconsin Univ Madison Dept of Veterinary Science  
**Association of Vertebrate Pathogens with Ecological Perturbation of Tropical Forests. Part I**  
Final rept.  
Robert P. Hanson, and Thomas M. Yuill. Oct 74, 144p AFOSR-TR-75-1644  
Grant AF-AFOSR-2337-72  
See also Part 2, AD-A019 543.

Descriptors: \*Pathogenic microorganisms, \*Virus diseases, \*Veterinary medicine, \*Tropical diseases, \*Ecology, Infectious diseases, Ecology, Disease vectors, Arthropod borne diseases, Insects, Forests, Viruses, Domestic animals, Verte-

brates, Viruses, Wildlife, Serology, Isolation, Laboratory tests, Colombia, South America.  
Identifiers: Ecosystems.

The study associates arthropod-borne viral diseases with ecologically diverse areas of Colombia, South America. The objective was to determine if domesticated animals, and to a limited lesser extent man, resident in the coastal plain, mountain valleys and highlands had been infected with certain insect-borne viruses. A record intensive study was carried out in an area of ecological transition to determine if the changes in bird, mammal biting insect populations and their associated viruses could be detected in primary and secondary forests and nearby croplands and pastures over a two-year period. Microbiological data are presented and discussed.

**AD-A019 543/8** PC A10/MF A01  
Wisconsin Univ Madison Dept of Veterinary Science  
**Entomological Studies. Part II**  
Final rept.  
Robert P. Hanson, and Thomas M. Yuill. Oct 74, 213p AFOSR-TR-75-1645  
Grant AF-AFOSR-2337-72  
See also Part 3, AD-A019 544.

Descriptors: \*Entomology, \*Insects, \*Ecology, \*Diptera, \*Tropical regions, Disease vectors, Arthropod borne diseases, Domestic animals, Humans, Forests, Colombia, South America, Culicoides, Culicidae.  
Identifiers: Hematophagous insects, Ecosystems, Phlebotomidae, Tabanidae, Simuliidae.

The entomological studies reported in this volume represent an effort to document environmental changes, such as habitat availability, host availability and climate, as they relate to the abundance and distribution of hematophagous Diptera. Some studies were conducted in primary and secondary forests and associated clearings which are areas of early ecological disturbance. Other studies were performed in an area of great ecological disturbance. The data show that the ecological changes have altered populations of biting insects and influence the potential and actual risk of transmission of arthropod-borne pathogens of man and domesticated animals.

**AD-A019 544/6** PC A11/MF A01  
Wisconsin Univ Madison Dept of Veterinary Science  
**Mammalogical, Ornithological and Plant Ecology Studies. Part III**  
Final rept.  
Robert P. Hanson, and Thomas M. Yuill. Oct 74, 236p AFOSR-TR-75-1646  
Grant AF-AFOSR-2337-72  
See also Part 2, AD-A019 543.

Descriptors: \*Ecology, \*Disease vectors, \*Wildlife, \*Tropical regions, Forests, Mammals, Birds, Plants(Botany), Vertebrates, Invertebrates, Pathogenic microorganisms, Colombia, South America.  
Identifiers: Ecosystems.

Disease causing agents are as real a part of tropical ecosystems as are the more conspicuous vertebrate, invertebrate and plant members. Tropical ecosystems are complex and man-induced modification may lead to increased disease prevalence. Prediction of disease problems related to ecological perturbation rests on understanding the composition and function of the ecosystem. Changes in populations of wild vertebrate reservoirs and insect vectors are the key to changes in disease incidence. The studies presented in this section represent an effort to describe the bird and mammal communities found in primary and secondary forests and associated agricultural clearings. Important information about the occurrence of certain pathogenic agents was also obtained.

**AD-A021 862/8** PC A05/MF A01  
Civil Engineering Lab (Navy) Port Hueneme Calif  
**Solar Heating of Buildings and Domestic Hot Water**  
Final rept. Jul 74-Dec 75  
E. J. Beck, Jr, and R. L. Field. Jan 76, 89p Rept no. CEL-TR-835

Descriptors: \*Solar heating, \*Solar collectors, Water, Space heaters, Hot water, Buildings, Solar radiation, Solar energy, Energy storage, Energy conservation, Cost analysis, Naval research.  
Identifiers: Insolation.

The purpose of this document is to provide guidance in the design and cost analysis of solar heating systems for buildings and domestic hot water (DHW). The nature of solar radiation, several types of solar systems, storage devices, and architectural considerations are among topics included. Calculation methods are included for determining collector size, storage size, simplified building and DHW loads, value of fuel saved, and saving-investment ratios. The calculation procedure is based on parametric curves for 'fraction of heating load supplied by solar energy' and several 'rules of thumb' for design. A series of 11 worksheets is used to enable the engineer with no prior experience with solar systems to accomplish a complete design and cost analysis. With this information he can prepare bidding and specification documents for the job. Tables of solar insolation at various Navy stations, typical building heat loads, collector prices by type, and storage tank prices are included. Two example problems are worked for tube-in-sheet collectors: one for space and DHW heating for a single dwelling, and the other DHW supply for a dispensary. Neither was found to be cost effective when competing against present day prices for natural gas. A directory of manufacturers and bibliography is also included. (Author)

**AD-A025 397/1** PC A07/MF A01  
Air Force Inst of Tech Wright-Patterson AFB Ohio  
**The Role of Communication Satellites in Education for Less-Developed Countries**  
Master's thesis  
David Earl Hughes. Oct 75, 133p Rept no. AFIT-CI-76-29

Descriptors: \*Communication satellites, \*Education, \*Developing nations, Television systems, Nations, Mass media, Television receivers, Satellite communications, India, Theses.  
Identifiers: Intelsat satellites.

The purpose of the study is to place the potentials and problems associated with communication satellites and educational television into perspective with the social, political, and economic resistance which often hinder the utilization of technological advancements. The study examines the need for an educational broadcasting satellite system in detail.

**AD-A026 041/4** PC A02/MF A01  
Construction Engineering Research Lab (Army)  
Champaign Ill  
**Method for Estimating Solar Heating and Cooling System Performance**  
Douglas C. Hittle, George N. Walton, and Donald F. Holshouser. 1976, 14p

Descriptors: \*Solar heating, \*Solar energy, \*Air conditioning equipment, Buildings, Geographical distribution, Solar radiation, Computerized simulation, Climate.

During FY75 the Construction Engineering Research Laboratory, under funding from the Office of the Chief of Engineers, engaged in a research effort to develop a method for the preliminary determination of the feasibility of heating and cooling buildings with solar energy. The principle objective of the work effort was to provide a simple means for estimating the expected performance of a given solar heating and cooling system when applied to typical buildings in various regions of the Country.

**AD-A026 264/2** PC A08/MF A01  
Air Force Inst of Tech Wright-Patterson AFB Ohio  
**Solid Waste Management - Tomorrow's Alternatives in the Urban-Rural Environment**  
Master's thesis  
Ronald J. Weedon. 1975, 161p Rept no. AFIT-CI-76-44

Descriptors: \*Waste disposal, \*Management planning and control, Regulations, Legislation, Materials recovery, Economic analysis, Collecting meth-



# APPROPRIATE TECHNOLOGY ABSTRACTS

ods, Shredding, Incinerators, Fuels, Packaging, Theses.  
Identifiers: \*Solid waste disposal, \*Waste recycling, Waste transfer stations, Sanitary landfills, Composts.

Solid wastes collection and disposal problems are enormous and inadequacies are not only polluting our land, air, and water, but are precipitating social, economic, and political problems as well. It is assumed that any design for solid waste management must include resource recovery as an integral part of the system, but only within the limits of cost/benefit advantages and, equally important, within the limits of developing markets for recovered materials. Viable alternatives are documented for solving the immediate problem and integrating the capability for conserving precious resources by enhancing the following objectives: (1) Improve efficiencies; (2) Enhance satisfaction; (3) Increase local knowledge and information; and, (4) Economically recover and process materials.

**AD-A029 258/1** PC A06/MF A01  
Naval Research Lab Washington DC  
**Proceedings of a Workshop on the Biodeterioration of Tropical Woods: Chemical Basis for Natural Resistance Held at Naval Research Laboratory, Washington, D.C. on October 17-18, 1974**  
John D. Bultman. Jul 76, 102p

Descriptors: \*Wood, \*Biodeterioration, \*Tropical regions, \*Meetings, Resistance(Biology), Chemical reactions, Biocides, Marine borers, Fungicides, Inhibition, Oxidation, Melanin, Response(Biology), Termites, Mollusca, Phenols, Polycyclic compounds, Cooling towers, Quinones.

Contents:  
Research at the Naval Research Laboratory on Bioreistant tropical woods:  
An Overview;  
Biocides from Marine borer resistant timbers;  
Dalbergia polyphenols and shell formation in mollusks;  
Preliminary results;  
Search for a 'Weak Link';  
The performance of Dalbergia wood and Dalbergia Extractives impregnated into pine and exposed in a water cooling tower;  
Inhibition of fungal growth and reproduction by obtusaquinone and some cinnamylphenols;  
Resistance of tropical woods to subterranean termites;  
Responses of the Formosan Subterranean Termite to tropical wood extracts;  
Field evaluation of natural wood extractives and some related compounds as antiborer agents;  
Comments on Melanin and polyphenoloxidase inhibitors.

**AD-A029 823/2** PC A02/MF A01  
Army Engineer Waterways Experiment Station Vicksburg Miss  
**Research and Development of Fiber-Reinforced Concrete in North America**  
Final rept.  
George C. Hoff. Feb 74, 19p Rept no. WES-MP-C-74-3  
Presented at Symposium on Concrete Research and Development (1970-1973) Sep 73, Sydney, Australia.

Descriptors: \*Reinforced concrete, \*Concrete, \*Fiber reinforcement, Reinforcing materials, Steel, Glass, Plastics, Fibers, Spallation, Impact strength, Flexural properties, Metal fibers, Glass fibers, Glass textiles.  
Identifiers: Mortars(Material), Ferrocement.

Fiber-reinforced concrete (FRC) in North America is emerging from the laboratory and is finding many potential applications. Steel, glass, and plastic fibers are being used in mortars and concretes to improve the characteristics of these materials, particularly the flexural and impact strengths. Steel-FRC is being used mostly for pavement overlays. Glass-fiber-reinforced cements are being used in architectural products. Plastic-fiber-reinforced products are being used for improved spall and impact resistance. The applications of FRC

are limited only by the ingenuity of the user.  
(Author)

**AD-A029 842/2** PC A02/MF A01  
Army Engineer Waterways Experiment Station Vicksburg Miss  
**Bamboo Reinforced Concrete**  
Miscellaneous paper  
Helmuth G. Geymayer, and Frank B. Cox. Jan 70, 19p Rept no. WES-MP-C-70-2  
See also Rept. no. AEWES-TR-C-69-C-1 dated Feb 69, AD-665 824.

Descriptors: \*Concrete, \*Reinforced concrete, \*Reinforcing materials, \*Fiber reinforcement, Bonding, Deformation, Shrinkage, Flexural strength, Cracking(Fracturing), Deflection, Strength(Mechanics).  
Identifiers: \*Bamboo.

Military construction activities in Southeast Asia have caused renewed interest in bamboo reinforcement and an investigation of the use of bamboo as expedient reinforcement for concrete was begun at the U. S. Army Engineer Waterways Experiment Station. The more important results and conclusions are summarized here.

**AD-A032 835/1** PC A06/MF A01  
Army Engineer Waterways Experiment Station Vicksburg Miss  
**Expedient Reinforcement for Concrete for Use in Southeast Asia. Report 3. Additional Tests of Bamboo**  
Frank B. Cox, and James F. McDonald. Dec 70, 101p Rept no. WES-TR-C-69-3-3  
See also Report 2, AD-706 846.

Descriptors: \*Reinforced concrete, \*Reinforcing materials, Plants(Botany), Preparation, Loads(Forces).  
Identifiers: \*Bamboo, \*Bamboo reinforcement.

This report summarizes the to-date (October 1969) results of a current WES study on the feasibility of using bamboo as an expedient reinforcement for temporary reinforced concrete structures. The report contains the results of an investigation of the most important engineering properties of an Asian species of bamboo (Phyllostachys bambusoides or Madake), some additional properties (since the publication of Report 1) obtained for the local Mississippi cane (Arundinaria tecta), description of short-time static tests conducted on 14 beams, description of tests of two beams subjected to sustained loading, conclusions, and tentative, to-date recommendations for the design of bamboo-reinforced members.

**AD-A032 970/6** PC A03/MF A01  
Army Engineer Waterways Experiment Station Vicksburg Miss  
**Water Hyacinth Research in Puerto Rico**  
Final rept.  
William N. Rushing. Sep 73, 33p Rept no. WES-MP-M-73-13

Descriptors: \*Water hyacinth, \*Weed control, \*Puerto Rico, Biological control, Productivity, Aquatic weeds, Snails, Food consumption, Electric power plants, Pumping, Lakes, Reservoirs.  
Identifiers: \*Pomacea australis, \*Eichhornia crassipes.

Water hyacinths are by far the most troublesome aquatic weeds in Puerto Rico. In 1972 the Tropical Terrain Research Detachment of the U. S. Army Engineer Waterways Experiment Station conducted a limited study on the productivity of water hyacinths in field situations and on the biological control of some native aquatics with the Brazilian snail, Pomacea australis. This paper presents some quantitative data on water hyacinth productivity in three different natural locations on the island. Data are also given on amounts and rates of consumption of aquatics by the snail, whose use as an agent for biological control of aquatic weeds appears promising.

**AD-A036 072/7** PC A08/MF A01  
Army Engineer Waterways Experiment Station Vicksburg Miss

**Proceedings, Research Planning Conference on the Aquatic Plant Control Program. 22-24 October 1975, Charleston, S. C**  
Final rept.  
Dec 76, 160 Rept no. WES-MP-A-76-1

Descriptors: \*Weed control, \*Aquatic weeds, \*Herbicides, \*Biological control, Aquatic plants, Conferences, State law, Pathogenic materials, Fishes, Streams, Inland waterways, Lakes, Aquatic organisms, Microorganisms, Water hyacinth, Rubber, Biodeterioration, Release mechanisms, Subtropical regions, United States, South America, Mexico.  
Identifiers: White amur fishes, 2-4-D herbicides, Silvex, \*Biological weed control.

Partial Contents: Status of Classification of Aquatic Herbicides; Aquatic Herbicide Tolerance; State Certification of Aquatic Herbicide/Pesticide Operations in Florida, Georgia, Texas, Oklahoma, and Arkansas; Aquatic Plant Problems in Puerto Rico; Reconnaissance Survey of Aquatic Weed Infestations in Lakes and Navigable Streams in Oklahoma; South American Field Studies of Prospective Biocontrol Agents of Weeds; Aquatic Weed Problems in Mexico and Texas and Some Measures for Control; Possible Effects of the Introduction of the White Amur into Lake Conway, Fla.; Aquatic Weed Versus Plant Pathogen -- A study of a biological control in action; Controlled Release Herbicides-Rubber formulations; 2,4-D in Slow-Moving Water; Extensive Degradation of Silvex by Synergistic Action of Aquatic Microorganisms; Integrated Control of Waterhyacinths with Four Biological Agents; Waterhyacinths-Nuisance of Benefit; and Large-Scale Field Test with the Monosex White Amur in Florida.

**AD-A038 482/6** PC A07/MF A01  
Michigan Univ Ann Arbor Dept of Geography  
**Urban Food Supply and Distribution: Characteristics and Utilization of Fresh Food Markets in Bangkok and Thonburi**  
Technical rept.  
Margaret E. Crawford. 22 Feb 74, 127p Rept no. TR-5  
Contract Nonr-1224(56)

Descriptors: \*Fresh foods, \*Marketing, \*Thailand, \*Urban areas, Food, Commerce, Commodities, Supplies, Sources, Rural areas.  
Identifiers: Bangkok(Thailand), Thonburi(Thailand).

This report deals with one aspect of the problem of food supply and distribution to urban areas. It describes major internal characteristics of nearly two hundred fresh-food markets or talat in Bangkok Thonburi, Thailand. These characteristics are then summarized in a measure of market utilization. Indicators of change within the market system are identified along with market responsiveness in meeting the changing needs of a rapidly growing urban population. (Author)

**AD-A041 526/5** PC A04/MF A01  
Decisions and Designs Inc Mclean Va  
**The Art of Cost-Benefit Analysis**  
Technical rept.  
Baruch Fischhoff. Feb 77, 59p  
Contract N00014-76-C-0074, ARPA Order-3052  
Prepared in cooperation with Decision Research Corp., Eugene Ore., Rept. no. DR-76-10 and Perceptronics, Inc., Woodland Hills, Calif., Rept. no. PTR-1042-77-2.

Descriptors: \*Cost benefits, \*Cost analysis, Decision making, Acceptability, Value engineering, Trees, Judgement(Psychology), Probability, Toxic hazards, Nuclear energy, Earthquakes.  
Identifiers: \*Benefit cost analysis.

Proposals for large-scale government and private projects are increasingly coming under the scrutiny of the cost-benefit analysis, decision analysis, risk assessment and related approaches. This paper presents a critical overview of such analyses. It discusses (1) their rationale; (2) their acceptability as guides to decision making; (3) the problems such analyses encounter; (4) how they may be misused; and (5) what steps are needed to increase their contribution to society. The discussion is illustrated with a variety of examples drawn, in



particular, from the evaluation of new technologies.

**AD-A044 343/2** PC A07/MF A01  
Army Engineer Waterways Experiment Station  
Vicksburg Miss  
**Potential Nonstructural or Low Cost Waterways System Improvements**  
Final rept.  
Frederick M. Ankla. Jun 71, 146p Rept no. WES-MP-O-71-1

Descriptors: \*Water traffic, \*Inland waterways, Operational effectiveness, Utilization, Optimization, Low costs, Cost benefits, Regulations, Locks(Waterways), Commodities, Barges, Towing, Modification, Management planning and control, Questionnaires.

The inland waterways system of the United States as it exists today has a number of problems associated with near-capacity traffic conditions. In many places on the Mississippi, Ohio, and Missouri Rivers and their navigable tributaries, there are serious impediments to the free flow of waterborne commerce. This study was conducted to determine the potential for more efficient utilization of existing inland waterways resources and facilities as a possible alternative to heavy investment in major construction. The study was based on distribution of a questionnaire, meetings and discussions with the Civil Works Task Group for Inland Waterways Systems Analysis, and visits to Corps of Engineers Civil Works offices and river sites by the author. The inland waterways system is an intimate interweaving of three significant subsystems: the physical waterway, the towing industry, and commodities. These subsystems and their interrelations are discussed in detail herein. It was determined that there are a number of areas of potential for improvement in the inland waterways system. These areas involve such items as changes in operating procedures of the locks, revisions of the operating rules for towboats approaching and using locks, staffing considerations, additional assistance at heavily trafficked locks, and other such factors.

**AD-A044 765/6** PC A02/MF A01  
Cold Regions Research and Engineering Lab Hanover NH  
**Effect of Geography on the Extensive Agricultural Use of Sewage (Wplyw Czynnika Geograficznego na Rozpowszechnienie Rolniczego Wykorzystania wód Ściekowych)**  
Jan Wierzbicki. Sep 77, 10p Rept no. CRREL-TL-642  
Trans. of Gaz Woda Technika Sanitarna (Poland) v24 n11 p407-410 1950, by Sam Blalock.

Descriptors: \*Sewage disposal, Waste recycling, Irrigation systems, Fertilizers, Rural areas, Agronomy, Agriculture, Urban planning, Climate, Terrain, Soils, Geographic areas, Land use, Waste management, Translations, Poland.  
Identifiers: \*Sewage irrigation.

This article considers the causes of the elimination of many irrigated fields in England when the development of this kind of arrangement was appearing in other countries. Unfavorable local and soil climatic conditions necessitated the replacement of irrigated fields by purification plants of another type. The liquidation of irrigated fields in England and in the Eastern United States should not be an example for countries in which other geographic conditions predominate. The considerable simultaneous increase in arrangements of this type in other countries proves the incorrectness of uncritical copying of England's example and negative reaction to the agricultural use of sewage water in localities with conditions which favor its use. (Author)

**AD-A044 767/2** PC A02/MF A01  
Cold Regions Research and Engineering Lab Hanover NH

**Disadvantages and Advantages of Sewage Disposal in Connection with Agricultural Utilization (Wady i Zalety Oczyszczania wód Ściekowych w Polaczeniu z Użyciem Rolniczym Wykorzystaniem)**  
Jan Wierzbicki. Sep 77, 10p Rept no. CRREL-TL-645  
Trans. of Gaz Woda Technika Sanitarna (Poland) v23 n6 p198-201 1949, by Sam Blalock.

Descriptors: \*Sewage disposal, Purification, Sewage treatment, Land use, Irrigation systems, Fertilizers, Agriculture, Waste treatment, Waste recycling, Productivity, Utilization, Urban planning, Rural areas, Translations, Poland.  
Identifiers: \*Sewage irrigation.

Although the purification of sewage in connection with agricultural use has certain disadvantages as mentioned in this report, the possibility of obtaining very significant economic advantages dictates the widest possible application of land treatment of sewage purification. (Author)

**AD-A044 982/7** PC A02/MF A01  
Stanford Univ Calif Systems Optimization Lab  
**Micro-Level Approaches for Improving Water Resource Knowledge Transfer in Rural Areas**  
Technical rept.  
Nathan Buras. Jun 77, 18p Rept no. SOL-77-12  
Contract N00014-75-C-0865

Descriptors: \*Water resources, \*Rural areas, Technology transfer, Irrigation systems, Water supplies, Water wells, Water quality, India, West Africa, Guatemala, Peru, Mexico, Israel, Conferences.  
Identifiers: \*Meetings, \*Developing countries, Information transfer.

One of the topics discussed at the Second International Conference on Transfer of Water Resources Knowledge (Colorado State University, Fort Collins, Colorado, June 29 - July 1, 1977) dealt with utilization of water resources knowledge in the context of regional development. Six papers were presented to the conference under this heading covering a broad range of issues: from a diagnostic description of a difficult situation in rural India, to a theoretical approach to the policy decisions relevant to rural modernization efforts. This general report summarizes the six papers, comments briefly on them, then focuses on two key points which were by-passed by the papers: (a) the resistance to change of farming communities at lower levels of technological sophistication; (b) attempts to overcome this resistance.

**AD-A047 981/6** PC A09/MF A01  
Maryland Univ College Park Inst for Fluid Dynamics and Applied Mathematics  
**Environmental Conditions in a Tropical Forest Region in Thailand**  
Contract rept.  
Helmut E. Landsberg, Owen E. Thompson, Robert E. Kaylor, and Rachel T. Pinker. Nov 74, 186p BN-799, PUB-109, ETL-0129  
Contract DAAK02-72-C-0287

Descriptors: \*Climate, \*Tropical regions, \*Meteorological data, Monsoons, Rainfall, diurnal variations, Seasonal variations, Rainfall intensity, Temperature, Forests, Weather stations, Weather forecasting, Southeast Asia, Thailand, Humidity.

Major results of a two year project to study the climatological and micrometeorological conditions in a tropical evergreen forest region are summarized in this report. The study has been under the sponsorship of the U. S. Army Engineer Topographic Laboratory. The forest area under study is in the interior of Thailand and is influenced by a cool, dry northeast monsoonal flow from November to March and a warm, moist southwest monsoonal flow from May to September. Measured information were collected during a three year field program sponsored by the U. S. Army Natick Laboratories and included ground station temperature, relative humidity, precipitation, evaporation, hours of sunshine, and tower measurements of temperature, dew point temperature, and wind speed, incoming and reflected solar radiation, incoming and outgoing infra-red radiation and sub-surface tem-

perature profiles in the forest and in a cleared area within the forest region.

**AD-A054 601/0** PC A05/MF A01  
Civil Engineering Lab (Navy) Port Hueneme Calif  
**Solar Heating of Buildings and Domestic Hot Water**  
Final rept. Jul 74-Dec 75  
E. J. Beck, Jr, and R. L. Field. Nov 77, 88p Rept no. CEL-TR-835

Descriptors: \*Solar heating, \*Housing(Dwellings), \*Hot water, Solar energy, Solar collectors, Water tanks, Heat transfer, Design to cost, Architecture, Sizes(Dimensions), Fuel consumption, Savings, Investments, Bibliographies.  
Identifiers: Solar space heating, Hot water heating, Solar water heating, Houses, Insulation, Cost analysis.

The purpose of this document is to provide guidance in the design and cost analysis of solar heating systems for buildings and domestic hot water (DHW). The nature of solar radiation, several types of solar systems, storage devices and architectural considerations are among topics included. Calculation methods are included for determining collector size, storage size, simplified building and DHW loads, value of fuel saved, and saving-investment ratios. The calculation procedure is based on parametric curves for 'fraction of heating load supplied by solar energy' and several 'rules of thumb' for design. A series of 11 worksheets is used to enable the engineer with no prior experience with solar systems to accomplish a complete design and cost analysis. With this information he can prepare bidding and specification documents for the job. Tables of solar insolation at various Navy stations, typical building heat loads, collector prices by type, and storage tank prices are included. Two example problems are worked for tube-in-sheet collectors: one for space and DHW heating for a single dwelling, and the other DHW supply for a dispensary. Neither was found to be cost effective when competing against present day prices for natural gas. A directory of manufacturers and bibliography is also included. (Author)

**AD-A057 032/5** PC A02/MF A01  
Office of the Chief of Engineers (Army) Washington DC  
**Fish Production in China. Transportation of Fish Eggs, Fry and Young**  
Yuh-Fann Chang. Jul 78, 21p

Descriptors: \*Fishes, \*Eggs, \*Transportation, Fisheries, Containers, Barrels, Production, Density, China, Handling.  
Identifiers: Fishing industry, Aquaculture, Dissolved gases, Oxygen, Carp, Mullet, Bigheads, Cargo transportation.

The proper transportation and handling of fish eggs and fry is a vital part of any fish production system. Careful planning is important. The first thing to decide is the type of container to be used to hold the fish. There are buckets and barrels of many sizes and designs, each with different characteristics. A second consideration is the density to which the fry should be packed in the container. This must be as dense as possible to save space and money, but not so dense as to kill the fish. The two most important factors in determining the maximum allowable density are water temperature and dissolved oxygen levels. Fish fry and eggs are shipped by three major means: by land, by water, and by air. This involves either trucks, trains, boats, airplanes, or human labor. Each method has advantages for different situations. During any form of transportation, water maintenance is necessary. If some sort of method for replenishing dissolved oxygen is used, replacement of water can be put off, but still not avoided. The source of fresh water must be inspected carefully before it is used. Clean pond water appears to be best. Any temperature difference between old and new water should be minimized. In more recent years, cultivation of mullet species has become prominent, moving in with the more traditional species, the carps and the bigheads. Most of the techniques used for the transportation of all species, including mullet, apply to their eggs. (Author)



**AD-A057 090/3** PC A02/MF A01  
 Letterman Army Inst of Research San Francisco Calif  
**Rural Nutrition of Monsoon Asia**  
 Final rept.  
 Robert Orr Whyte. 1977. 3p Rept no. LAIR-77-53  
 Availability: Pub. in American Jnl. of Clinical Nutrition, v30 n7 p1198-1199 1977.

Descriptors: \*Nutrition, Monsoons, Asia, Reprints.  
 Identifiers: Rural areas.

No abstract available.

**AD-A057 315/4** PC A03/MF A01  
 Office of the Chief of Engineers (Army) Washington D C  
**Fish Production in China. The Rearing of Fish Fry and Fingerlings**  
 Yuh-Farn Chang. Jul 78, 43p

Descriptors: \*Fishes, \*Fisheries, \*China, Breeding, Production, Cleaning, Ponds.  
 Identifiers: Reproduction(Biology), \*Aquaculture, Dredging, Pest control, Calcium oxides, Bleaching agents, Effectiveness, Animal nutrition, Feeding stuffs, Fertilizers, Sewage, Manure, Leguminous plants, Byproducts.

The supply of fish fry and fingerlings is of primary concern to the fish culturing industry. In order to increase the supply, it is necessary to improve rearing techniques. The first of many parts to this program is to improve pond condition. It is recommended that rearing ponds be drained and cleaned once a year. The cleaning process involves treatment with various chemical substances, and simple mud removal (dredging). This reduces the incidence of disease, eliminates pest species and other harmful organisms, and facilitates repair of the pond's structure. Many different chemicals can be used, although lime and bleaching powder seem to be the most effective. The second area to be considered is that of fry nutrition. Different species of fry have different food preferences. For this reason, they can be found in different areas of the pond. For each species of fish, slightly different pond and fertilizer conditions are considered optimal. The basic fertilizers used are grass, cow manure, soybean milk, and peanut cakes. Recent experiments using human sewage have proven very successful, with exciting prospects for the future. A third consideration is the selection of a suitable rearing pond. Characteristics of a good pond are: an ample water source, appropriate size and depth, circular shape, level bottom, non-leaking, and plenty of sunlight.

**AD-A057 539/9** PC A02/MF A01  
 Walter Reed Army Inst of Research Washington D C  
**A Preventive Medicine Team in a Refugee Relief Operation -- Fort Chaffee Indochina Refugee Camp (April - July 1975)**  
 Joel C. Gaydos, Lee E. Ashmore, Thomas J. McNeil, Thomas A. Mino, and Marvin L. Bertsch. 1978, 5p  
 Availability: Pub. in Military Medicine, v143 n5 p318-321 May 78.

Descriptors: \*Preventive medicine, \*Public health, \*Refugees, Hazards, Safety, Military medicine, Surveys, Evacuation, Environmental protection, South Vietnam, Reprints.  
 Identifiers: \*Indochina, Foreign countries.

No abstract available.

**AD-A057 551/4** PC A02/MF A01  
 Naval Medical Research Unit No 2 Apo San Francisco 96263  
**Parasites of Man in Remote Areas of Central and South Sulawesi, Indonesia**  
 Technical rept.  
 W. P. Carney, P. F. D. Van Peenen, R. See, E. Hagelstein, and B. Lima. 1977, 14p  
 Availability: Pub. in Southeast Asian Jnl. of Tropical Medicine and Public Health, v8 n3 p380-389 Sep 77.

Descriptors: \*Parasites, Indonesia, Villages, Intestinal parasites, Schistosomiasis, Malaria, Filariasis, Tropical medicine, Surveys, Reprints.

Identifiers: Sulawesi(Indonesia), Humans, Foreign countries.

No abstract available.

**AD-A058 861/6** PC A02/MF A01  
 Association of Scientists and Engineers of the Naval Air and Sea Systems Command Washington Dc  
**Why Not Sails**  
 Kenneth C. Morisseau. Mar 78, 23p  
 Proceedings of the Annual Technical Symposium (15th), Association of Scientists and Engineers of the Naval Air and Sea Systems Command, Washington, DC 1978.

Descriptors: \*Marine propulsion, \*Wind, Naval architecture, Energy conservation, Technology forecasting, Prototypes, Trade off analyses, Ship hulls.  
 Identifiers: \*Sailboats.

With the shortage of fossil fuels becoming a serious problem and the high cost and environmental hazards of nuclear propulsion, it appears to be a good time to go back and take a hard look at the use of sails as the device and wind as the energy source for ship propulsion. (In the interest of adding credence to what may be considered a questionable endeavor, it should be noted that serious studies are being made both in Britain and West Germany concerning the practicality of sail propulsion for commercial vessels.) The paper reviews the history of sails as a means of propulsion, the capabilities and limitations of modern sailing ship designs with both conventional displacement hulls and unconventional hull forms such as semi-submersible and hydrofoil supported considered. A variety of designs to suit naval and commercial applications are provided for further consideration. (Author)

**AD-A060 212/8** PC A06/MF A01  
 Miami Univ FL Dept of Dermatology  
**Fungous and Bacterial Skin Infections in the Tropics**  
 Final rept. 1 Jun 71-31 May 76  
 David Taplin. Aug 78, 114p  
 Contract DADA17-71-C-1084

Descriptors: \*Bacterial diseases, \*Fungus diseases, \*Infectious diseases, \*Tropical diseases, \*Skin diseases, Tropical regions, Epidemiology, Therapy, Chemotherapy, Preventive medicine, Panama, Venezuela, Costa Rica, Guatemala, Vietnam, Soaps.  
 Identifiers: Tinea corporis, Tinea cruris, Tinea pedis, Columbia, Infections.

Bacterial skin infections in the tropics are the predominant cause of dermatological disease in civilians and are directly related to temperature, humidity, exposure, and living conditions. Substandard housing and poor hygiene, biting and vector insects contribute to high rates of infection. Tropical skin infections are usually streptococcal. In military populations, personnel on field operations are at highest risk. Support troops, even in the tropics, have a much lower incidence of streptococcal pyoderma. Currently available deodorant soaps do not prevent skin infections, but chlorhexidine gluconate looks promising. Epidemic furunculosis is related to close social contact, and may be more common than most physicians realize. Early treatment with antibiotics plays a significant role in prevention of new furuncles among contacts. Antibiotic resistant strains of bacteria pose new problems in cutaneous microbiology. Severe fungal infections of the skin may attack up to 70% of military personnel in hot humid environments. Occlusion is the most significant factor, and appears to be related to accumulation of CO2 under damp clothing. Combined therapy of tinea corporis/cruris with topical miconazole/hydrocortisone is highly effective. Hydrocortisone alone makes these infections worse in the tropics. Topical clotrimazole is effective in the treatment of dermatophytosis, but tinea pedis is difficult to treat and usually recurs.

**AD-A060 779/6** PC A12/MF A01  
 Army Engineer Waterways Experiment Station Vicksburg MS

**Proceedings, Research Planning Conference on the Aquatic Plant Control Program Held at New Orleans, Louisiana on 3-6 October 1977**  
 Final rept.  
 Aug 78, 270p Rept no. WES-MP-A-78-1

Descriptors: \*Aquatic plants, \*Plant growth, \*Environmental management, Conferencing(Communications), Louisiana, Army Corps of engineers, Environmental engineering, Marine biology, Water hyacinth, Experimental data, Waterways, Control, Harbors.  
 Identifiers: \*Eurasian watermilfoil, \*Aquatic Plant Control, Pest control.

The 12th Annual Meeting on the U. S. Army Corps of Engineers Aquatic Plant Control Research Program was held in New Orleans, La., on 3-7 October 1977 to review current operations activities and to afford an opportunity for presentation of current research projects. (Author)

**AD-A061 469/3** PC A03/MF A01  
 Army Engineer Waterways Experiment Station Vicksburg MI  
**Concrete for Earth-Covered Structures**  
 Final rept.  
 James E. McDonald, and Tony C. Liu. Sep 78, 31p WES-MP-C-78-15, CTIAC-34

Descriptors: \*Underground structures, \*Concrete, \*Waterproofing, Permeability, Moisture, Porosity, Fiber reinforced composites, Strength(Mechanics), Habitability, Construction materials.  
 Identifiers: \*Earth covered structures.

Low permeability to water is a primary consideration in the design and construction of earth-covered concrete structures. Factors affecting the permeability of concrete are generally classified into three groups: (1) constituent materials; (2) methods of concrete preparation; and (3) subsequent treatment of the concrete. Each group of factors is examined in this paper and recommendations are made on how to obtain concrete that is virtually impermeable. Also, some specialized concretes with potential applications in earth-covered structures are discussed briefly. These include polymer-impregnated, polymer, and fiber-reinforced concretes and ferro-cement. (Author)

**AD-A062 903/0** PC A06/MF A01  
 Middlebrooks and Associates Logan UT  
**Wastewater Stabilization Pond Linings**  
 Special rept.  
 E. Joe Middlebrooks, Catherine D. Perman, and Irving S. Dunn. Nov 78, 118p CRREL-SR-78-28  
 Contract DACA89-77-C-1895

Descriptors: \*Waste water, \*Ponds, \*Sealing compounds, \*Linings, Soil stabilization, Waste treatment, Environmental protection, Asphalt, Concrete, Plastics, Costs, Protective coatings, Moistureproofing.  
 Identifiers: \*Wastewater stabilization lagoons, Bentonite, Water pollution control, Hydrology.

A review of the literature on wastewater stabilization lagoon linings covering the work during the past 20 years is presented. Design, operating and maintenance experiences are presented for soil sealants, natural sealants, bentonite clays, chemical treatments, gunite, concrete, asphaltic compounds, plastics and elastomers. The characteristics of various materials, applicability to different wastes, construction techniques and details of installation techniques are presented. Installation costs for various materials and comparative costs are summarized. A summary of reported seepage rates for various types of lining materials is presented. A survey of the 50 states was conducted to determine the requirements for liners and allowable seepage rates. Requirements are varied and depend upon the local soil conditions and the experiences of the regulatory agencies with various materials. The trend is toward more stringent requirements. Accepted design and installation procedures are summarized, and detailed drawings of installation techniques are presented. Recommendations of the manufacturers and installers of liners are also presented. (Author)



**AD-210 105/3** PC A07/MF A01  
National Academy of Sciences - National Research Council Washington D C  
**Indigenous Tropical Agriculture in Central America: Land Use, Systems, and Problems**  
C.L. DOZIER. 3 Oct 58, 134p Rept no. ffrp r 3p594ffrp r 3p594  
Contract nonr230009  
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

Descriptors: \*Agriculture.  
Identifiers: \*Central America.

No abstract available.

**AD-417 467/8** PC A07/MF A01  
California Univ Livermore Lawrence Radiation Lab  
**Patterns of Settlement and Subsistence in Southwestern Angola**  
Alvin W. Urquhart. 1963, 149p Rept nos. NRC-R-18, Pub-1096  
Contract Nonr230009  
Also available from Printing and Publishing Office, NRC, Washington, D. C. for \$4.00 per copy.  
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

Descriptors: \*Survival(Personnel), Economics, Agriculture, Housing(Dwellings), Social sciences, Food, Storage, Population, Terrain, Processing.  
Identifiers: \*Angola, Rural areas, Developing countries, Africa.

This study presents the findings of a year of field work in Portugal and Angola. The author attempts to describe and explain the patterns of settlement and subsistence of the farmer-herders and neighboring African peoples who live on the Huila Plateau of southwestern Angola. A historical background of the occupation and colonization of this area by Europeans supplements this study. (Author)

**AD-464 900** PC A02  
Special Operations Research Office, Washington, D. C. Counterinsurgency Information Analysis Center.  
**Irrigation as a Factor in the Economic Development of Thailand.**  
James R. Price. Jun 64, 10p Rept no. SORO/CINFAC/1-64  
Contract DA-49-092-ARO-7

Descriptors: \*Irrigation systems, Thailand, \*Cereals, Irrigation systems, History, Economics, Floods, Counterinsurgency, Agriculture, Rural areas.

The question of irrigation and flood control in Thailand has been historically bound together not only with the immediate problems of production of Thailand's main export crop of paddy rice, but with the pattern of Thailand's foreign economic and political relations. Developmental irrigation and flood control projects only now nearing completion are virtually identical to those recommended more than half a century ago by a Dutch irrigation adviser, and which could have been completed within twelve years at a fraction of the cumulative costs, both in capitalization and crop losses, to date. (Author)

**AD-600 859** PC A02  
Forest Products Lab Madison Wis  
**Woodworking Machines.**  
May 64, 2p FPL-048

Descriptors: \*MACHINES, WOOD, \*SAWS, WOOD, MILLING MACHINES, INDUSTRIAL EQUIPMENT, MATERIAL SEPARATION.  
Identifiers: WOODWORKING MACHINES.

Woodworking machines are made to do a wide variety of jobs. For any one job there are usually a number of makes, sizes, and styles of machines from which to choose. They are not standardized. Only a brief classification and outline of specifications for fairly typical machines of the more important types is attempted. Small light machines of the home workshop size are not included. Woodworking machines may be divided into three broad classes based on function: sawmill, planing mill,

and industrial plant machinery. The function of sawmill machinery is to cut the log into rough, green lumber. The planing mill takes the rough lumber (usually dry), and prepares it for general construction uses, such as flooring, siding, shiplap, or framing. The industrial plant cuts up lumber and makes it into doors, furniture, boxes, or other fabricated products. (Author)

**AD-615 459** PC A02  
Special Operations Research Office American Univ Washington D C  
**A Selected Inventory of Latin American Agricultural Colonies with Annotated Bibliography.**  
Curtin Winsor Jr., and Joseph Macrum. 1964, 2p Rept no. soroc/cinfac/18-65

Descriptors: \*RURAL AREAS, SOUTH AMERICA, \*SOUTH AMERICA, RURAL AREAS, \*CENTRAL AMERICA, RURAL AREAS, AGRICULTURE, BIBLIOGRAPHIES, BRAZIL, CHILE, COLOMBIA, ECUADOR, GUATEMALA, HONDURAS, PERU, VENEZUELA.  
Identifiers: COLONY PROJECT, LATIN AMERICA, BOLIVIA, PARAGUAY, URUGUAY, COLONIZATION.

With a few noted exceptions, this paper is limited in its scope to agricultural colonies and settlements that were founded after 1945 and had sufficient literature to justify a profile-outline. As such, the paper identifies only a small part of the literature on the process of land settlement in present-day Latin America. (Author)

**AD-636 809** PC A02 MF A01  
Rand Corp Santa Monica Calif  
**A Short Survey of Colombian Agricultural Development in Recent Years.**  
Dalbert A. Fitchett. 25 May 66, 2p Rept no. P-3370

Descriptors: \*Agriculture, \*Colombia, Reviews, Rural areas, Economics, Population, Production, Commerce, Food, Geography.

No abstract available.

**AD-638 118**  
McGill Univ Montreal (Quebec) Dept of Geography  
**Savanna-Tropical Forest Boundaries Symposium: Venezuela.**  
Technical rept. on Savanna Research Project.  
Theo L. Hills. 1 Jul 66, 2p Rept no. Occasional Paper-1  
Contract Nonr-3855(00)  
Availability: Published in Nature and Resources v1 n4 p1-5 Dec 1965.

Descriptors: \*Geography, \*Venezuela, Ecology, Jungles.  
Identifiers: Savanna ecosystem.

No abstract available.

**AD-651 116** PC A04 MF A01  
American Univ Washington D C Center for Research in Social Systems  
**Resettlement in Latin America: An Analysis of 35 Cases.**  
Milton Jacobs, Alexander R. Askenasy, and Norita P. Scott. Apr 67, 55p  
Contract DA-49-092-ARO-7

Descriptors: \*Management planning, Latin America, \*Government(Foreign), Economics, United States government, Agriculture, Military training, Population, Political science, Social sciences, Rural areas, Education, Medicine, Housing, Federal budgets.

A study of agricultural settlements (or colonies) in Latin America: the history of settlement, current governmental efforts in colonization, and an analysis of the colonies in terms of success or failure are included. Detailed description of five of the settlements is appended.

**AD-653 856** PC A03 MF A01  
Naval Research Lab Washington D C

**Natural Resistance of Woods to Biological Deterioration in Tropical Environments. Part I. Screening Tests of a Large Number of Wood Species.**

Interim rept.  
C. R. Southwell, C. W. Hummer, Jr., B. W. Forgeson, T. R. Price, and T. R. Sweeney. 7 Feb 62, 49p Rept no. NRL-5673-Pt-1

Descriptors: \*Wood, Biological contamination, \*Tropical deterioration, Wood, Identification, Sampling, Exposure, Test methods, Marine borers, Resistance(Biological), Isoptera, Degradation, Tropical tests, Sea water, Soils, Fungus deterioration.

In four different tropical environments, heavily infested with wood-destroying organisms, 114 species of scientifically identified woods have been undergoing a screening test for periods up to an 18-month exposure. Many of the woods were selected because of their reputed resistance to biological attack. Results of marine borer resistance studies have revealed 21 woods to be highly resistant to borers in Pacific Ocean water for the first 14 months of exposure. In tropical brackish water only 3 woods studied were highly resistant and very heavy damage was observed on 69 during the 14-month period. Stake tests in tropical jungle soil on both the Atlantic and Pacific Coasts of Panama showed 26 woods to be very durable to both subterranean termites and fungal decay for the first 18 months of exposure. A number of these resistant woods had not been studied previously. From the results of these studies, each wood included has been assigned resistance ratings of high, moderate, or low in respect to marine borer attack in sea water, teredo attack in brackish water, subterranean termites in tropical soil, and fungal decay in contact with jungle soil. Detailed descriptions of wood species which are considered to be of special interest are included. (Author)

**AD-657 007** PC A02 MF A01  
Rand Corp Santa Monica Calif  
**Review of 'Changing Patterns of Administration in Rural East Pakistan'.**  
Wayne Wilcox. Aug 67, 5p Rept no. P-3647

Descriptors: \*Government(Foreign), Pakistan, Rural areas, Political science, Suburban areas, Leadership, Management engineering, Economics, Social sciences, Reports, South Asia.

A very brief review of the book Changing Patterns of Administration in Rural East Pakistan which was prepared at the Asian Studies Center, Michigan State University.

**AD-657 858** PC A10 MF A01  
California Univ Berkeley Dept of Geography  
**A Historical Geography of the Santa Marta Area, Colombia.**  
James R. Krogzemis. 1967, 224p  
Contract Nonr-3656(03)

Descriptors: \*Geography, Colombia, History, Climatology, Archaeology, Terrain, Agriculture, Population, Rural areas, Economics, Aquatic animals, Forestry, Recreation, Industries, Mountains, Beaches, Environment, Rivers, Tables, Maps.

Contents: Prehistory and Spanish conquest; The lowlands and coast surrounding the Sierra Nevada de Santa Marta; The Cienaga Grande de Santa Marta; The highlands of the Sierra Nevada de Santa Marta; The Indians of the Sierra Nevada.

**AD-664 641**  
Arizona Univ Tucson Inst of Arid Lands Research  
**Inventory of Research on Weather and Climate of Desert Environments.**  
Clayton H. Reitan, and Christine R. Green. 1967, 78p  
Contract DA-49-092-ARO-71  
Chapter 2 of Inventory of Geographical Research on Desert Environments. See also Chapter 5, AD-664 013.  
Availability: Published in Copyright Journal.

Descriptors: \*Climatology, Deserts, Wind, Storms, Atmospheric temperature, Atmospheric motion, Tropical regions, Water, Measurement, Instrumentation.



tation, Evapotranspiration, Artificial precipitation, Fog, Classification, Solar radiation, Indexes, Bibliographies.

Contents: Discussion of state of knowledge; (Climatic data, climatic data for each desert, synoptic climatology, weather systems, desert storms, upper-air circulations, aridity, climatic typing and indexes of aridity, weather modification, microclimate, radiation, bibliographies, depositories).

**AD-668 852** PC A09 MF A01  
Arizona Univ Tucson Inst of Arid Lands Research  
**Inventory of Research on Vegetation of Desert Environments.**  
William G. McGinnies. 1967, 190p  
Contract DA-49-092-ARO-71  
Chapter 6 of Inventory of Geographical Research on Desert Environments. See also Chapter no. 5, AD-664 013.  
Availability: Published in Copyrighted journal.

Descriptors: \*Plants(Botany), Deserts, Reviews, Scientific research, Trees, Grasses, Periodic variations, Colors, Soil mechanics, Physical properties, Sand, Fires, Herbicides, Food, Fibers(Natural), Insects, Fuels, Tables, Bibliographies.

The objective of the study chapter is to review and evaluate existing information and research on the vegetation of the deserts of the world, to ascertain notable deficiencies, and to propose possible future research and improvements to the general body of knowledge of desert vegetation. (Author)

**AD-668 853**  
Arizona Univ Tucson Inst of Arid Lands Research  
**A General Summary of the State of Research on Ground-Water Hydrology.**  
Eugene S. Simpson. 1967, 24p  
Contract DA-49-092-ARO-71  
Chapter 8 of Inventory of Geographical Research on Desert Environments. See also Chapter 6, AD-668 852.  
Availability: Published in Copyrighted journal.

Descriptors: \*Hydrology, Deserts, Water, Terrain, Natural resources, Reliability, History, Well logging, Surface properties, Dams, Underground, Drainage, Storage, Physical properties, Management planning, Sources, Israel.

This report is one of a series under a program started in November, 1964, entitled 'An Inventory of Geographical Research on Desert Environments.' Geographic areas covered by the inventory were generally those classified as arid or extremely arid. Some variation in coverage occurs from chapter to chapter, without change in the objective of compiling and presenting the greatest possible amount of useful information in the allotted time. The purpose of the inventory is to determine in detail what topics have been or are being investigated for the world's deserts, to appraise the reported work, and to disclose areas of study where further work is needed. The series of chapters does not attempt to recapitulate all information known about the deserts of the world, but rather comprises a compendium-guidebook to past and present research. It is based upon a critical review of the published literature augmented by consultations with specialists. (Author)

**AD-670 260** PC A03 MF A01  
Rand Corp Santa Monica Calif  
**Political Consequences of Rural Development Programs in Indonesia.**  
Guy J. Pauker. May 68, 30p Rept no. P-3864  
Presented at the Political Development Seminar of the Southeast Asia Development Advisory Group, Dec 1967, Los Angeles, Calif.

Descriptors: \*Agriculture, Indonesia, \*Political science, Indonesia, Economics, Population, Rural areas, Social sciences, Leadership, Attitudes, Government(Foreign), Decision making, Public relations, Statistical data, Management planning, History.

A discussion is presented of the agrarian situation in Indonesia and of the political consequences of the failure of all rural development programs since

the achievement of independence in 1949. Some conclusions are drawn concerning the order of magnitude of the agrarian problem facing Indonesia. The most salient fact is that, according to current estimates by the International Bank for Reconstruction and Development, in the 1960-1966 period rice production increased at a rate of 1.6 percent per year whereas the population growth rate was 2.4 percent. (Author)

**AD-671 856** PC A08 MF A01  
McGill Univ Montreal (Quebec) Dept of Geography  
**The Ecology of the Forest/Savanna Boundary (Proceedings of the Igu Humid Tropics Commission Symposium, Venezuela, 1964).**  
Technical rept. on Savanna Research Project  
Theo L. Hills, and Roland E. Randall. May 68, 153p Rept nos. TR-14, Savanna Research Series-13  
Contract Nonr-3855(00)

Descriptors: \*Plants(Botany), \*Ecology, Trees, Grasses, Rainfall, Distribution, Climatology, Soils, History, Paleontology, Floods, Deserts, Fires, Animals, Humidity, Symposia, Tropical regions, Venezuela, Canada.  
Identifiers: Savannas.

The report is the outcome of a symposium on the ecology of the forest/savanna boundary. The papers presented at the meeting have been cut and edited so that a theme is presented rather than a series of papers. In the introduction, the problems involved in savanna classification and the ambiguity of terminology are discussed, types of savanna found in different parts of the world described, and methods of examination analysed. The section is concluded by a description of the field trip made by the Symposium members, during which many of the differences in altitude were seen in a fresh light. A second chapter is concerned with savanna/forest boundaries held stable by factors of the physical environment; here the roles of flooding and desiccation, climate, soils and geomorphology are examined. In the third chapter the authors discuss stable boundaries resulting from human action. Fire and the role of domesticated grazing animals are seen as the major factors. The subject of the fourth section is the boundary when not in equilibrium. Many factors are examined in different parts of the world including soil, wild animals, fire, palaeoclimatology and man. An evaluation is made of the use of palynological and historical data. (Author)

**AD-675 354** PC A02 MF A01  
National Research Council of Canada Ottawa (Ontario) Div of Building Research  
**Opening Unserved LOTS to Building by Use of Septic Tank.**  
Housing Note  
W. B. Watson. Jul 66, 6p Rept no. HN-27  
Reprinted from Canadian Builder, v16 n5 p42-45 May 66.

Descriptors: \*Sewage, Rural areas, \*Tanks(Containers), Sewage, Hazards, Soils, Terrain, Population, Design, Economics, Operation, Maintenance, Substitutes, Specifications, Public health, Canada.  
Identifiers: Septic tanks.

The value, construction, maintenance, and operation of septic tanks in isolated areas are discussed, along with problems and hazards.

**AD-676 124** PC A05 MF A01  
Applied Scientific Research Corp of Thailand Bangkok  
**Tropical Environmental Data (Trend): Cooperative Research Programme No. 27.**  
Semiannual rept. no. 2, 1 Jul-31 Dec 67. 1968, 96p  
Contract DAJB29-67-C-0122

Descriptors: \*Forestry, Tropical regions, \*Rainfall, Thailand, Hydrology, Micrometeorology, Soils, Materials, Deterioration, Bacteria, Fungi, Periodic variations, Rivers, Terrain, Mapping, Evapotranspiration, Sensors, Atmospheric temperature, Plants(Botany).  
Identifiers: Dry-evergreen forest.

The programme is an interdisciplinary study of a dry-evergreen forest environment in the 1,500 mm annual rainfall zone about 300 km north-east of Bangkok and 60 km south of Nakhon Ratchasima (Khorat). The programme is providing a reference framework of data on environmental factors, particularly those which relate to tropical deterioration of materials and to personnel operating in tropical forest environments, and is examining the interaction of meteorological, hydrological, soils, vegetation and other biological factors in such environments. (Author)

**AD-677 010** PC A14 MF A01  
Smithsonian Institution Washington DC  
**Ecological Study in Korea. Part I. A Cooperative Program for Ecosystem Research in Korea.**  
Final rept. Oct 66-Sep 68  
Helmut K. Buechner, Edwin L. Tyson, and Ke Chung Kim. Sep 68, 311p AFOSR-68-2148  
Contract F44620-67-C-0013  
See also Part 2, AD-676 660.

Descriptors: \*Ecology, Southeast Asia, Education, Biology, Research program administration, Natural resources, Plants(Botany), Personnel, Reports, Animals, Soils, Climatology.  
Identifiers: Demilitarized zones, \*Korea, Developing countries.

The program of 'Ecological Study in Korea' that was sponsored by the Smithsonian Institution and the Air Force Office of Scientific Research was initiated with the following objectives: (1) to provide a general description of the vegetation, animal life, soils, physiography, and climate of the study area; (2) to prepare appropriate vegetation and physiographic maps to accompany the descriptions; (3) to carry out a series of research projects of a preliminary nature on the physical characteristics, flora, and fauna of the study area by Korean scientists; and (4) to prepare a sound proposal for a long-range program to be submitted to granting agencies. (Author)

**AD-678 292** PC A02 MF A01  
Harvard Univ Cambridge Mass East Asian Research Center  
**Agriculture as the Foundation.**  
Ezra F. Vogel. Oct 68, 23p AFOSR-68-2543  
Contract AF 49(638)-1399  
Availability: Pub. in World Politics, v28 n4 p761-779 Jul 68.

Descriptors: \*Agriculture, China, \*Production control, Effectiveness, Communism, Decision making, Economics, Rural areas, Problem solving, Management engineering.  
Identifiers: Collective farming, Villages.

China's decision to collectivize agriculture was sudden and required a series of adjustments. Following collectivization, it was necessary first to develop and later expand private plots, but this created such serious problems for the collective fields that they were again eliminated in 1958. Despite collectivization and inputs into villages, agriculture which was the foundation of industrial development was not producing enough to make possible more rapid economic development from the period of mid-1950's until the mid-1960's. It was for this reason that greater efforts were placed in the early 1960's on agriculture. (Author)

**AD-678 728** PC A04 MF A01  
Rand Corp Santa Monica Calif  
**Relative Wages, Skill Shortages, and Changes in Income Distribution in Colombia.**  
Robert L. Slighton. Nov 68, 75p Rept no. RM-5651-RC-AID  
Contract F44620-67-C-0050

Descriptors: \*Labor, Colombia, Manpower studies, Wages, Inequalities, Growth, Statistical distributions, Rural areas, Urban areas, Employment, Classification, Tables, Agriculture, Industries, Transformations, Economics, Training.  
Identifiers: Income distribution, Skill shortages.

An analysis is made of the income distribution relative to the economic growth in Colombia. Distribution of income in Colombia has been, and is, very



unequal: 10 percent of the population of the large cities receives about half of the total personal income. This study examines the hypothesis that this inequality will widen if growth of the modern sector of the economy is retarded after the transition from agrarianism to the dual economy is begun. (Author)

**AD-679 182** PC A04 MF A01  
Negev Inst for Arid Zone Research Beersheba (Israel) Dept of Geobotany  
**Use of Vegetation as an Indicator for Soil Properties under Desert Conditions.**  
Annual rept. no. 2, 1 Oct 65-1 Dec 66  
Gideon Orshan, Uri Gavish, and Ilan Borovic.  
Mar 68, 67p  
Contract DA-91-591-EUC-3806

Descriptors: \*Soils, Deserts, \*Plants(Botany), Deserts, Classification, Thickness, Sand, Distribution, Clay, Physical properties, Climatology, Plant tissue, Water, Measurement, Israel.  
Identifiers: Summer, Negev Desert.

The report discusses the root systems in sandy deserts as related to soil properties. 13 leading species were excavated and described. These are classified in three types. Soil moisture was measured at two locations in the Negev desert during the summer of 1966 and its use by plants discussed. The effect of sand cover and irrigation on the competition between leading desert psamophytes was examined. (Author)

**AD-679 459** PC A10 MF A01  
National Academy of Sciences-National Research Council Washington D C Foreign Field Research Program  
**The Effects of African Agricultural Practices on Soil Productivity and Nutrient Levels in Kenya.**  
Final rept.  
Paul L. Lehrer. Sep 61, 209p  
Contract N00014-67-A-0244

Descriptors: \*Rural areas, Agriculture, \*Agriculture, \*Kenya, Soils, Soil mechanics, Production, Nutrition, Deterioration, Fertilizers, Economics, Sociology, Structural geology, Climatology, Rainfall, Maps.  
Identifiers: Nutrients.

The purpose of this study is to examine the effects of African agricultural practices in Kenya on soil productivity. Emphasis is placed on discovering what effects cultivation would have on the nutrient levels of virgin soils in that country. It was found that fragmentation, female labor, and the attitude toward fertilization was actually more important than the more tangible physical considerations in understanding the basic characteristics of African agriculture. The deterioration of the physical condition of the soil through continuous cultivation perhaps is more responsible for a decreased productivity than is nutrient depletion. Only through sustained use of fertilizers can the productivity of Kenya soils be substantially increased. The economic future of the African farmer will depend upon his ability to obtain a higher income through the sale of cash crops. (Author)

**AD-679 473** PC A08 MF A01  
National Academy of Sciences-National Research Council Washington D C Foreign Field Research Program  
**Drained-Field Agriculture in Southwestern Tlaxcala, Mexico.**  
Final rept.  
Gene C. Wilken. Sep 68, 155p  
Contract N00014-67-A-0244

Descriptors: \*Rural areas, Agriculture, \*Agriculture, \*Mexico, Climatology, Rainfall, Population, Soils, Drainage, Floods, Erosion, Irrigation systems, Deposition, Production, Reclamation, Ecology, Sociology.  
Identifiers: Tlaxcala(Mexico).

This study examines the land and water management problems of Tlaxcala, concentrating on the southwestern portion of the state which lies at the northern end of the Basin of Puebla on the Mesa Central of Mexico. To cope with poorly drained,

sand-filled streamways which threaten flood and deposition on basin floor soils, the Tlaxcala farmers practice sophisticated land conservation and reclamation techniques, using a minimum of equipment. In the process, they have created a productive and distinctive agricultural region. A description of the methods they employ to maintain and expand the agricultural base in this difficult environment forms part I of this study. In part II, the ecology of farm life is discussed and the geographical relationship between complexes of agricultural practices, social systems, and populations is discussed. (Author)

**AD-679 474** PC A11 MF A01  
National Academy of Sciences-National Research Council Washington D C Foreign Field Research Program  
**A Biogeographical Investigation of the Sierra de Tuxtla in Veracruz, Mexico.**  
Final rept.  
Robert F. Andrie. 1963, 248p  
Contract N00014-67-A-0244

Descriptors: \*Natural resources, Rural areas, \*Rural areas, \*Mexico, Mountains, Volcanoes, Structural geology, Soils, Climatology, Drainage, Birds, Animals, Forestry, Archaeology.  
Identifiers: Biogeography, Veracruz(Mexico), Sierra de Tuxtla.

The Sierra de Tuxtla, a small, isolated volcanic mountain area near the Gulf coast of southern Veracruz, Mexico, affords excellent conditions for biogeographical investigations. The present study describes the manner in which physical and human factors have influenced native vegetation, non-transient avifauna and larger forest mammals in this tropical region. Physical factors considered are geology, land configuration, climate, drainage and soils; human factors examined include population, settlement and forms of land use. The Sierra has no major industrial raw materials, so agriculture continues to be the principal occupation, with commercial plantations providing export products. Although attempts are being made to improve agriculture and conserve forests, immediate and effective measures are required to control land use and enforce game laws. Varied natural habitats and a rich fauna provide excellent bases for a national park or wildlife refuge. Such an area would conserve forests, soils, water and wildlife, and afford a place for scientific study and recreation. A working man-land relationship must be established if the Sierra's natural resources are to be used wisely, its agricultural productivity increased and natural features preserved. (Author)

**AD-679 475** PC A12 MF A01  
National Academy of Sciences-National Research Council Washington D C Foreign Field Research Program  
**A Philippine Sugar Cane District: Spatial Phenomena Affecting Sugar Cane Production on the Haciendas.**  
Final rept.  
Norman W. Schul. Aug 62, 256p  
Contract N00014-67-A-0244

Descriptors: \*Agriculture, \*Philippines, Statistical analysis, Climatology, Terrain, Management planning, Labor, Commerce, Rural areas, Machines, Regression analysis, Transportation, Industries, Soils, Production, Site selection, Maps.  
Identifiers: Sugar cane.

The study primarily involves the analysis of physical and cultural factors affecting sugar cane yield although it will also further an understanding of the spatial organization of sugar cane production. The study is based on the Victorias Milling District, which covers approximately 37,000 hectares in northern Negros Occidental Province in the central Philippines. A simple model was used to describe the area's spatial organization of sugar cane production in the sphere of plantation agriculture. The model stipulates (1) an extensive land area, (2) mono-cropping, (3) centralized managerial control, (4) an abundant labor supply and (5) production for the export market. It has these further qualities which are believed to be comparable for most sugar cane districts in the Philippines: the characteristic hacienda-central settlements, the problems of mechanization, and the quota system for sugar

cane. The yield factors studied were hacienda size, hauling distance from the hacienda to the mill, the slope, soil quality, the necessity for trucking, tenure, and the type of power used in land preparation. (Author)

**AD-679 477** PC A11 MF A01  
National Academy of Sciences-National Research Council Washington D C Foreign Field Research Program  
**Approaches to Spatial Structure: Field Studies in India.**  
Final rept.  
Robert C. Mayfield. 1958, 247p  
Contract N00014-67-A-0244

Descriptors: \*Rural areas, Housing, \*Housing, \*India, Population, Density, History, Sampling, Sociology, Costs, Commerce, Agriculture, Analysis of variance, Physiology.  
Identifiers: Nomads, Land use.

This is a collection of studies representing approaches to spatial structure in India. The first study deals with the Baazighars and Gadolias, traditionally nomadic groups in the Indian Punjab, as to the impacts of canal irrigation and political partition. The topic of the second study is physiological densities in which three villages of Bihar are studied. Agriculturally unproductive land is subtracted from overall village area in order to obtain a ratio suggesting meaningful rural population pressures. The third study uses the small portion of the valley of upper Beas River for comparing the relative efficiency of systematic, stratified random, and haphazard methods of line sampling of land use. The fourth and major study examines the spatial structure of two districts of Central Punjab, India. (Author)

**AD-679 833** PC A02 MF A01  
Air Force Office of Scientific Research Arlington Va Directorate of Information Sciences  
**Information Services for Small-Scale Industry.**  
Rowena W. Swanson. 1968, 4p AFOSR-68-2663  
Presented at the Puerto Rico Conference on Information Technology and Resources, San Juan, Puerto Rico, 20-21 Jun 68.  
Availability: Pub. in American Documentation, v19 n4 p412-413 Oct 68.

Descriptors: \*Information retrieval, \*Industries, Scientific research, Technical information centers.  
Identifiers: \*Information services, Transfer of technology.

The report presents highlights of several papers which reviewed experiences of large-scale and specialized information systems and services from the viewpoint of their value to small-scale, science-based industries, particularly those in developing regions. A climate conducive to technological change appears to be a cornerstone to the building and financing of effective, interactive, information-transfer networks. (Author)

**AD-683 052** PC A02 MF A01  
Army Biological Labs Frederick Md  
**Portable Laboratory Kit for Water Testing under Field Conditions.**  
S. M. Drachev, and S. D. Zamyslova. 13 Mar 52, 5p Rept no. Trans-654  
Trans. of Gigiena i Sanitariya (USSR) v15 n7 p45-48 1950.

Descriptors: \*Water supplies, Test equipment, Sanitary engineering, Laboratory equipment, Portable, Chemical analysis, Rural areas, USSR.  
Identifiers: Translations.

No abstract available.

**AD-684 411** PC A02 MF A01  
Naval Civil Engineering Lab Port Hueneme Calif  
**Bamboo Reinforced Concrete Construction.**  
Technical note  
Francis E. Brink, and Paul J. Rush. Feb 66, 21p  
Rept no. NCEL-TN-808

Descriptors: \*Naval research, Reinforced concrete, Reinforcing materials, Fibers(Natural), Mixtures, Cements, Cracks, Moistureproofing, Mechanical properties.



# APPROPRIATE TECHNOLOGY ABSTRACTS

Identifiers: \*Bamboo reinforced concrete.

This report has been prepared to assist field personnel in the design and construction of bamboo reinforced concrete. Comments on the selection and preparation of bamboo for reinforcing are given. Construction principles for bamboo reinforced concrete are discussed. Design procedures and charts for bamboo reinforced concrete are given and conversion methods from steel reinforced concrete design are shown. (Author)

**AD-685 455** PC A02 MF A01  
Forest Products Lab Madison Wis  
**Natural Decay Resistance of Fifteen Exotic Woods Imported for Exterior Use.**  
Forest Service research paper  
Joe W. Clark. Mar 69, 7p\* Rept no. FSRP-FPL-103

Descriptors: \*Wood, Degradation, Exposure, Classification, Sampling, Soils, Tropical deterioration, Structures, Atmospheric temperature, Fungus deterioration, Least squares method, Insects, Moisture.  
Identifiers: Heartwood.

An evaluation based on laboratory and field testing of the decay resistance of 15 species of wood, mostly tropical. (Author)

**AD-685 224** PC A07 MF A01  
Army Engineer Waterways Experiment Station Vicksburg Miss  
**Expedient Reinforcement for Concrete for Use in Southeast Asia. Report 1. Preliminary Tests of Bamboo.**  
Technical rept.  
Frank B. Cox, and Helmuth G. Geymayer. Feb 69, 139p Rept no. AEWES-TR-C-69-3-1

Descriptors: \*Reinforced concrete, Reinforcing materials, Reviews, Organic materials, Feasibility studies, Tensile properties, Bonding, Degradation, Aging(Materials), Beams(Structural), Loading(Mechanics), Life expectancy.  
Identifiers: \*Bamboo, Arundinaria tecta.

The report summarizes the preliminary results of a study of the feasibility of using bamboo as an expedient reinforcement for temporary, reinforced concrete structures. The report contains an extensive review of the literature, a description of the test procedures, results of an investigation of the most important engineering properties of bamboo, descriptions of tests of 26 bamboo-reinforced structural elements (20 simply supported beams with 6-ft (1.83-m) spans, and 6 simply supported two-way slabs of varying length, width, and depth), and conclusions and tentative recommendations for the design of bamboo-reinforced structures. (Author)

**AD-686 717** HC A02 MF A01  
Forest Products Lab Madison Wis  
**Preservative Treatments for Protecting Wood Boxes.**  
Forest Service research paper  
A. F. Verrall, and T. C. Scheffer. Apr 69, 10p\*  
Rept no. FSRP-FPL-106

Descriptors: \*Wood, Protective treatments, Containers, Preservation, Weatherproofing, Effectiveness, Storage, Exposure, Fungusproofing, Insects, Deterioration, Tropical regions, Life expectancy.  
Identifiers: Dip treatments, Boxes(Containers).

An evaluation of the effectiveness of three-minute dip treatments in various wood preservatives for wood boxes stored off the ground for more than 10 years in both a southern and a northern climate. (Author)

**AD-686 836** HC A04 MF A01  
Arizona Univ Tucson Inst of Arid Lands Research  
**Inventory of Research on Desert Regional Types.**  
John R. Healy. 1968, 69p\*  
Contract DA-49-092-ARO-71  
Chapter 9 of Inventory of Geographic Research on Desert Environments. See also Chapter 8, AD-668 853.

Descriptors: \*Deserts, Reviews, Scientific research, Classification, State-of-the-art reviews, Research program administration, Background, Geography, Environment, Terrain.  
Identifiers: Desert regional types, Annotated bibliographies.

The purpose of the inventory is to determine in detail what topics have been or are being investigated for the world's deserts, to appraise the reported work, and to disclose areas of study where further work is needed. The series of chapters does not attempt to recapitulate all information known about the deserts of the world, but rather comprises a compendium-guidebook to past and present research. It is based upon a critical review of the published literature augmented by consultations with specialists. (Author)

**AD-687 028** HC A02 MF A01  
National Academy of Sciences-National Research Council Washington D C Foreign Field Research Program  
**Space, Change and Feng-Shui in Tsuen Wan's Urbanization.**  
Baruch Boxer. 1968, 16p Rept no. 31A  
Contract Nonr-2300(09)  
Prepared in cooperation with Michigan State Univ., East Lansing.  
Availability: Pub. in Jnl. of Asian and African Studies, v3 n3-4 p226-240 Jul/Oct 68.

Descriptors: \*Urban planning, \*Hong Kong, Urban areas, Population, Housing, Rural areas, Public opinion, Construction.

To write of 'change' in the context of Tsuen Wan's urbanization, is not simply a matter of describing the tangible evidence of urban growth or delimiting its parameters. Changes in population and area, mounting levels of capital investment and industrial production, fluctuations in land values, and other measurable indices of urbanization are descriptive of an essentially pragmatic response to the development plan which has defined the broad limits of urbanization. More significantly, the successful application of traditional Chinese conceptions of 'change' to the immediate demands of urbanization has facilitated a smooth transition to a modern urban-industrial society. (Author)

**AD-687 318** HC A03 MF A01  
Rand Corp Santa Monica Calif  
**The Organizational Approach Versus the Societal Approach to Development in Emerging Nations.**  
Paul T. McClure. May 69, 33p Rept no. P-4058

Descriptors: \*Political science, \*Management planning, Theory, Organizations, Sociometrics, Correlation techniques, Systems engineering, Problem solving, Decision making, Effectiveness.  
Identifiers: \*Developing countries, Public administration, Comparison.

Comparisons of public administrative systems on a national or regional level require much simplification, so that the descriptions and prescriptions which result may be too broad to be operational. The mission of the paper is to compare societal units with organizational units to determine which give a more appropriate focus point for analysis in order to achieve national development. (Author)

**AD-701 167** HC A08 MF A01  
Human Resources Research Organization Alexandria, Va  
**Planned Change in Agrarian Countries.**  
Technical rept.  
Arthur H. Niehoff. Dec 69, 157p Rept no. HUMRRO-TR-69-21  
Contract DAHC19-70-C-0012

Descriptors: \*Management planning, \*Rural areas, Culture, Social communication, Economics, Agriculture, Sociology.  
Identifiers: Agrarian countries, Social change, Ethnic groups, \*Civic programs.

The report is an effort to provide operationally relevant concepts and guidelines for persons responsible for planning and implementing development projects in agrarian countries. A framework for de-

scribing or evaluating the conduct of development projects is proposed, and applied to the results of an analysis of 203 case studies of past projects. Influences, conditions, and techniques which appear to affect project outcome are: (1) local cultural characteristics, such as leader patterns, social structure, and economic patterns; (2) motivation for change, including felt needs and perceived practical benefits; and (3) project strategies, such as the innovator's image characteristics, communication, and participation. The case study analysis suggests that factors of special importance to success in development projects are cooperation of local leaders, degree and immediacy of practical benefits which recipients anticipate, innovator skill in communication processes, participation of recipients in implementing the change, and establishing arrangements for maintenance of the innovation by the local people. (Author)

**AD-701 189** HC A03 MF A01  
Army Engineer Waterways Experiment Station Vicksburg Miss  
**Precast Concrete Elements with Bamboo Reinforcement.**  
Technical rept.  
May 64, 28p Rept no. AEWES-TR-6-646

Descriptors: \*Reinforced concrete, Experimental design, \*Reinforcing materials, \*Grasses, Tensile properties, Beams(Structural), Army research, Feasibility studies, Plants(Botany), Loading(Mechanics), Stresses, Test methods, Cracks.  
Identifiers: Precast concrete, Bamboo.

The document covers investigation and tests of bamboo for use as reinforcing material in light emergency concrete constructions where steel is not available or economically justified, but bamboo and labor are available in quantity.

**AD-703 222** HC A13 MF A01  
National Academy of Sciences-National Research Council Washington D C Foreign Field Research Program  
**Recent Historical Plant Geography of Martinique. i.**  
Final rept.  
Clarissa Therese Kimber. Dec 69, 277p  
Contract N00014-67-A-0244-0001  
Continuation of Contract Nonr-2300(09). See also AD-703 223.

Descriptors: \*Geography, Plants(Botany), \*Mapping, Plants(Botany), \*Lesser antilles, \*Plants(Botany), Trees, Shrubs, Ecology, Selection, History, Classification, Identification, Terrain, Rock(Geology), Volcanoes, Mountains, Hydrology, Soils, Deserts, Grasses, Economics, Sociology, Maps, Tropical regions.  
Identifiers: Martinique Islands, Rain forests, Forest plantations, Vegetation, Ornamental plants.

The report contains historical developments in the plant geography of the tropical French island of Martinique. Changing geographic patterns of vegetation and changing roles of those processes are discussed.

**AD-703 223** HC A11 MF A01  
National Academy of Sciences-National Research Council Washington D C Foreign Field Research Program  
**Recent Historical Plant Geography of Martinique. ii.**  
Final rept.  
Clarissa Therese Kimber. Dec 69, 244p  
Contract N00014-67-A-0244-0001  
Continuation of Contract Nonr-2300(09). See also AD-703 222 and AD-703 224.

Descriptors: \*Geography, Plants(Botany), \*Mapping, Plants(Botany), \*Lesser antilles, \*Plants(Botany), Trees, Agriculture, Swamps, Grasses, History, Regeneration, Rainfall, Shrubs, Fruits, Vegetables, Terrain, Seacoast, Maps, Tropical regions, Islands.  
Identifiers: Martinique Island, Forest plantations, Rain forests, Ornamental plants, Vegetation.

In 1963 geographic patterns of vegetation for the island of Martinique West Indies were mapped at



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different scales. The report contains maps and historical sketches showing modifications in the agricultural system and technological changes.

**AD-703 224** HC A13 MF A01  
National Academy of Sciences-National Research Council Washington D C Foreign Field Research Program  
**Recent Historical Plant Geography of Martinique. iii.**  
Final rept.  
Clarissa Therese Kimber. Dec 69, 298p  
Contract N00014-67-A-0244-0001  
Continuation of Contract Nonr-2300(09). See also AD-702 223.

Descriptors: \*Geography, Plants(Botany), \*Mapping, Plants(Botany), \*Lesser Antilles, \*Plants(Botany), Trees, Mountains, Shrubs, Terrain, Rainfall, Agriculture, Soils, Classification, Seacoast, Grasses, Vegetables, Fruits, Islands, History, Maps, Aerial photographs, Tropical regions.  
Identifiers: \*Martinique Island, Rain forests, Forest plantations, Ornamental plants, Vegetation.

In 1963 the actual geographic patterns of vegetation for the island of Martinique, West Indies, were mapped at different scales. The vegetation of the lower elevations was mapped completely and the mountain vegetation was sampled. Some 59 plant cover units were distinguished in the field for mapping which were classified into vegetation types and used in discussions of vegetation patterns.

**AD-703 232** HC A19 MF A01  
National Academy of Sciences-National Research Council Washington D C Foreign Field Research Program  
**Modernization in a Regional Context: Pretheory and Practice in Western Nigeria.**  
Final rept.  
Thomas Harden Eighmy. Oct 69, 447p  
Contract N00014-67-A-0244-0001  
Prepared in cooperation with Wisconsin Univ., Madison, Dept. of Geography. Continuation of Contract Nonr-2300(09).

Descriptors: \*Economics, \*Nigeria, Reviews, Management planning, Environment, Agriculture, Commerce, Urban areas, Rural areas, Government(Foreign), Population, Roads, Communication systems, Factor analysis, Attitudes, Mathematical prediction.  
Identifiers: Modernization.

Modernization, viewed in a regional setting, is a process resulting jointly in areal integration and differentiation. A conceptual spatial model of modernization is proposed. The arguments developed are applied to Western Nigeria in relation to the location of agricultural production, the development of a system of periodic food markets, and the unequal modernization of the large preindustrial Yoruba towns. Measurement of the spatial aspects of modernization is achieved through the use of principal components analysis with components scores, regression analysis with residuals, and trend surface fitting. (Author)

**AD-703 235** HC A17 MF A01  
National Academy of Sciences-National Research Council Washington D C Foreign Field Research Program  
**The Milk Supply of Major Indian Cities.**  
Final rept.  
Richard A. Ellefsen. 1964, 386p  
Contract N00014-67-A-0244-0001  
Continuation of Contract Nonr-2300(09).

Descriptors: \*Milk, Production, \*Urban planning, \*India, Food, Problem solving, Economics, Rural areas, Production control, Bovines, Terrain, Organizations, Predictions, Management planning, Distribution.  
Identifiers: Demand(Economics), Delhi(India), Bombay(India), Madras(India), Calcutta(India).

The paper examines the milk industry in India in detail in order to point up its problems. The recent efforts towards improvement are assessed; an overview of the entire country is presented along with an intensive examination of the present and

potential milk-supplying hinterlands for Delhi, Bombay, Madras, and Calcutta. Emphasis throughout the work is on the areal and locational aspects of the milk supply. (Author)

**AD-703 278** HC A03 MF A01  
Rand Corp Santa Monica Calif  
**The Philippine Family Planning Program: Some Suggestions for Dealing with Uncertainties.**  
John E. Koehler. Feb 70, 35p Rept no. RM-6149-AID  
Contract F44620-67-C-0050

Descriptors: \*Philippines, Population, \*Population, Control, \*Reproduction(Physiology), Control, Females, Public health, Education, Sociology, Statistical data, Attitudes.  
Identifiers: Demography, AID(Agency for International Development), Agency for International Development, \*Birth control.

Some tentative conclusions about family planning in the Philippines are presented. Using data from National Demographic Survey (NDS), the study investigated knowledge and use of birth control procedures among Philippine women by language, income, age, rate of use, information source, and use or nonuse. The study offers the following suggestions to designers of the AID family planning program in the Philippines: (1) to avoid explicit reference to some population growth rate as a formal program goal; (2) to examine the complex relationship between knowledge and use of contraceptive techniques; (3) to gather information from across the country rather than in depth from any single area or ethnic group; and (4) to use its leverage over the various agencies concerned to record experiences of individual women and to standardize recordkeeping. (Author)

**AD-703 884** HC A18 MF A01  
Arizona Univ Tucson Inst of Arid Lands Research  
**Desert Research: Selected References 1965-1968.**  
Technical rept.  
Patricia Paylore, and W. G. McGinnies. Dec 69, 419p\* ES-52  
Contract DAAG17-67-C-0199

Descriptors: \*Deserts, \*Bibliographies, Plants(Botany), Mammals, Climatology, Hydrology, Seacoast, Economics, Geography, Social sciences, Agriculture, Geology, Ecology, Tropical regions, Abstracts.  
Identifiers: Landforms, Geomorphology, Ground water.

The report consists of a selection of 1,094 references (many of which are annotated) to worldwide desert literature for the period 1965-1968, together with an appendix of 385 references published before 1965, with the emphasis on vegetation, fauna, geomorphology and surface hydrology, weather and climate, surface materials, geohydrology, regional geography, and desert coastal areas, as well as a limited number dealing with various aspects of the human, cultural, economic, and political geography of deserts. Titles have been permuted to provide an index of significant keywords. (Author)

**AD-704 160** HC A03 MF A01  
McGill Univ Montreal (Quebec) Dept of Geography  
**The Savanna Landscapes of the Amazon Basin.**  
Technical rept. on Savanna Research Project  
Theo L. Hills. Jul 69, 50p Rept nos. TR-15, Savanna Research Series-14  
Contract Nonr-3855(00)

Descriptors: \*Plants(Botany), Distribution, \*Climatology, \*British Guiana, Classification, Trees, Rainfall, Ecology, Soils, Moisture, Grasses, Shrubs, Swamps, Tropical regions, Forest fires, Rivers, Canada.  
Identifiers: \*Savanna landscapes, Amazon River, Vegetation.

The following hypothesis is presented and defended. Climate is a predisposing factor, not a determining factor. Climate, characterised as it is in many parts of the Amazon Basin by a distinctive dry season of up to seven months in length, as in

the Rupununi-Rio Branco region, often makes the presence of tropical rain forest problematical and predisposes the environment towards the development of savanna vegetation. Low soil fertility and laterite are frequently considered as prime determinants of savanna vegetation but here they are considered as features associated with savanna landscapes, especially on senile, pediplaned surfaces. Occasionally they may be resultant factors, as when the nutrient cycle is broken after the disappearance of forest cover. Fire, which is also frequently considered a prime determinant, is generally a maintaining factor, but in limited areas may be causal, in the sense that it is immediate in chronological terms. The stage of geomorphic evolution and the dominant geomorphic processes in the landscape are those factors which most directly influence the position and behaviour of the water table, the soil moisture regime, the soil nutrient cycle, the ecoclimates of the region and thus, the distribution of forest and savanna. (Author)

**AD-704 261** HC A04 MF A01  
Forest Products Lab Madison Wis  
**Properties of Imported Tropical Woods.**  
Forest Service research paper  
B. Francis Kukachka. Mar 70, 69p\* Rept no. FSRP-FPL-125  
Presented at the Conference on Tropical Hardwoods, State University College of Forestry, Syracuse Univ., 18-21 Aug 69.

Descriptors: \*Wood, Physical properties, \*Tropical regions, Wood, Classification, Machinability, Shrinkage, Flexural strength, Statistical data, Mechanical properties.  
Identifiers: Heartwoods, Sapwoods.

Descriptions are of more than 100 tropical genera and generic groups of wood are provided, with emphasis on properties that affect their utilization. Botanical names, common names, and principal growth areas are included. (Author)

**AD-707 560** HC A03 MF A01  
Hebrew Univ Jerusalem (Israel) Dept of Sociology  
**Innovation, Social Exchange, and Institutionalization.**  
Final scientific rept.  
S. N. Eisenstadt. 15 Feb 70, 42p AFOSR-70-1634TR  
Grant AF-EOAR-23-67

Descriptors: \*Culture, Group dynamics, \*Social psychology, Pattern recognition, Organizations, Attitudes, Interactions, Urban areas, Rural areas, India, Western Europe, Latin America, Communism.  
Identifiers: Developing countries, Status segregation, Intelligentsia.

A summary report is made on a comparative study of the conditions under which innovation and change are accepted in developing nations. It is shown that major determinants of status segregation as over against status association does not lie in socio-demographic factors but in the relation between status group and control center (government). Different types of status segregation are closely correlated with their access to and 'distance' from the central control; while increase in class association is correlated with the degree of participation in 'center' formation. These patterns are illustrated by comparative analyses of Asian and Latin American countries. (Author)

**AD-709 715** HC A09 MF A01  
Army Research Office Durham N C  
**Optimum Subsurface and Underground Shell Structures for Better Housing in Hot-Arid Lands. Part I: A Case for Subsurface and Underground Housing in Hot-Arid Lands. Part II: Optimization of Subsurface and Underground Shells.**  
Interim technical rept. no. 1  
Sudhir Kumar, and Jason Cheng-Chuan Shih.  
Apr 70, 179p\*  
Research in Some Aspects of Fluid and Solid Mechanics.

Descriptors: \*Underground structures, Structural shells, \*Housing, Underground structures, Re-



## APPROPRIATE TECHNOLOGY ABSTRACTS

views, Construction materials, Numerical analysis, Tropical regions.  
Identifiers: \*Subsurface housing, \*Underground housing.

This report consists of two distinct parts. A case was made for subsurface and underground housing in hot-arid lands in Part I. This includes discussions of environmental conditions, past developments of subsurface housing, new conceptual designs for dwellings, apartments, complexes of large and multiple buildings and transportation tunnels, etc. Part II of the report presents analytical optimization of subsurface cylindrical shells and completely underground shells, with a view to keep at a minimum the quantity of material used in the shells. The subsurface cylindrical shells are optimized by limit analysis, whereas the optimum shape and thickness distribution of the underground shells is determined by elastic analysis. Shapes of several shells have been determined as examples and design charts for general use have been prepared for all these shells. (Author)

**AD-709 718** HC A02 MF A01  
Forest Products Lab Madison Wis  
**Natural Decay Resistance of 30 Peruvian Woods.**  
Forest Service research paper  
T. L. Highley, and T. C. Scheffer. Jul 70, 6p\*  
Rept no. FSRP-FPL-143

Descriptors: \*Wood, \*Fungus deterioration, \*Peru, Wood, Tropical deterioration, Exposure, Damage, Wear resistance, Weight, Classification, Resistance(Biological), Statistical data, Test methods.  
Identifiers: Hardwoods, Decay resistant wood.

Thirty Peruvian species of possible commercial significance were evaluated by soil-block testing for resistance to decay fungi. The tests indicated that 25 percent of the species would be resistant or highly resistant for use in contact with the ground and that 50 percent of the species would be resistant or highly resistant for use above ground. Decay resistance was found to be substantially correlated with the specific gravity of the various species. (Author)

**AD-713 201** HC A03 MF A01  
Picatinny Arsenal Dover N J  
**Field Fabrication of Continuous Lightweight Reinforced Plastic Pipe. Phase I. Literature Search.**  
Technical rept.  
Arnold E. Molzon. Jun 70, 29p\* Rept no. PA-TR-4085

Descriptors: \*Reinforced plastics, \*Pipes, \*Bibliographies, Reinforced plastics, Curing agents, Polymerization, Ultraviolet radiation, Manufacturing methods, Abstracts.  
Identifiers: \*Plastic pipes, Linings.

A literature search has been made for references on field fabrication of reinforced thermoset plastic pipe for transporting military fuel. Sources searched include: Department of Defense, PLAS-TEC holdings, and the open literature. One hundred and eighteen abstracted references are listed, with an author index and subject index included. No references were found on actual production of reinforced plastic pipe in the field. Thirteen references are listed on continuous manufacture of reinforced pipe, fifteen on curing resins by ultraviolet, and eighteen on pipe liners. (Author)

**AD-714 914** PC A09 MF A01  
Army Foreign Science and Technology Center Washington DC  
**Excerpts from Treatments for Textile Materials.**  
P. A. Simigin, M. N. Zusman, and F. I. Raikhlin.  
16 Jun 70, 186p Rept no. FSTC-HT-23-613-70  
Trans. of mono. Zashchitnye Propitki Tekstilnykh Materialov, Moscow, 1957.

Descriptors: \*Cellulose, \*Fungus deterioration, \*Fungus proofing, Cellulose, \*Textiles, Fungus proofing, \*Fungicides, Cellulose, \*Moistureproofing, Textiles, \*Fire resistant textiles, Manufacturing methods, Cotton textiles, Photochemistry, Micro-

organisms, Copper compounds, Chromium compounds, Test methods, Chromates, USSR.  
Identifiers: \*Tanning materials, \*Biodeterioration, Translations.

The book describes methods of treatment giving cellulose materials resistance to the effects of micro-organisms (to rotting), and giving fabric made of cellulose fibers water repellant and fire resistant properties, and also preventing the development of moths on silk materials. The book also presents modern methods of testing these treated materials. (Author)

**AD-715 802** PC A08 MF A01  
Pennsylvania State Univ University Park  
**The Impact of Modernization in the Philippines II.**  
Technical rept. no. 2  
George M. Guthrie. Aug 67, 174p  
Contract Nonr-656(37), ARPA Order-855  
Prepared in cooperation with Ateneo de Manila (Republic of the Philippines). See also Technical rept. no. 1, AD-656 122, and Technical rept. no. 3, AD-689 868.

Descriptors: \*Philippines, Economics, \*Anthropology, Philippines, Industries, Fishes, Food, Culture, Children, Personality, Linguistics.  
Identifiers: \*Modernization, \*Economic development.

Contents: The fishing industry of Estancia, Iloilo; Cultural differences in the use of guilt and shame in child rearing: a review of the research on the Philippines and other non-western societies; The antecedents and correlates of aiding responses: a review of the literature; and Cognitive mapping in the Tagalog area.

**AD-715 871** PC A07 MF A01  
Duke Univ Durham N C  
**Weight and Energy Values of Selected Litter-Fall Components from Two Forest Stands in the Canal Zone Republic of Panama.**  
Final rept. 5 May 67-4 Nov 70, 0 10 Frank W. / Woods  
1970, 127p AROD-7382:2-EN  
Grant DA-ARO(D)-31-124-G938

Descriptors: \*Forestry, \*Panama, \*Plant tissue, Sampling, Weight, Trees, Deposits, Shrubs, Degradation, Energy, Moisture, Ecology, Site selection, Tropical regions.  
Identifiers: \*Forest litter, Vegetational decay.

Weights of selected plant parts and species composing litter fall were measured for more than one year in two forest stands in the Canal Zone. One stand was on the Caribbean side, the other on the Pacific. Seasonal values for kilograms and kilocalories per hectare were computed. (Author)

**AD-716 235**  
Chicago Univ III Dept of Geography  
**Rural Markets and Trade in East Africa. A Study of the Functions and Development of Exchange Institutions in Ankole, Uganda.**  
Research paper  
Charles M. Good. 1970, 272p RP-128, NAS-NRC-FFRP-39  
Contract Nonr-2300(09)  
Prepared in cooperation with San Fernando Valley State Coll.  
Availability: Paper copy available from The University of Chicago, Dept. of Geography, 1101 E. 58th St., Chicago, Ill. 60637. \$4.50. No copies furnished by DDC or NTIS.

Descriptors: \*Economics, Subsaharan Africa, \*Commerce, \*Subsaharan Africa, Organizations, Rural areas, Reviews, Distribution(Economics), Classification, Statistical data, Behavior, Factor analysis.  
Identifiers: Ankole(Uganda), \*Uganda, Developing countries, \*East Africa, Exchanging.

The study is organized into two parts, the first of which is concerned with the nature of the Ankole market system in 1968. It begins with an overview of the survey area, including a discussion of field procedures and methods, by a typology of markets, a comparative analytical profile of African

traders based on some 900 interviews, and an analysis of the spatial behavior of market consumers. Part 2 endeavors to place the contemporary marketing system in historical perspective. (Author)

**AD-716 400** PC A02 MF A01  
Yale Univ New Haven Conn School of Forestry  
**Properties of Tropical Woods.**  
Final rept.  
Frederick F. Wangaard. 31 Dec 69, 10p  
Contract Nonr-609(13)

Descriptors: \*Wood, Physical properties, Military requirements, Boats, Aircraft, Piers, Adhesives, Density, Strength, Degradation, Laminates, Wood pulp, Naval research, Bibliographies.  
Identifiers: Tropical woods.

The research have been the basis for a series of Technical Reports -- 45 in number -- dealing with such diverse subjects as gluing characteristics, weathering characteristics, fiber-saturation point of wood, water-vapor sorption characteristics, mechanical behavior under sustained and repeated loading, decay resistance, wood properties affecting adhesion and glue-line behavior, the cutting of veneer, stabilizing effects of plastic overlays, properties of wood-core laminates, curvature-stress factor in laminated wood, fiber characteristics influencing pulp-sheet properties, factors influencing chemical resistance of wood, wettability of wood, and stress relaxation. (Author)

**AD-716 403** PC A02 MF A01  
Yale Univ New Haven Conn School of Forestry  
**Moisture Absorption in Certain Tropical American Woods (Revised).**  
Technical rept.  
M. R. Samborski, G. T. Tsoumis, and Frederick F. Wangaard. 1 Jun 49, 20p Rept no. TR-8  
Contract N6ori-44

Descriptors: \*Wood, Moisture, Salts, Water, Distribution, Test methods, Statistical data, Absorption.  
Identifiers: \*Tropical woods.

The report supplements and summarizes an earlier one of the same title and covers a study undertaken as part of a continuing investigation of the properties of tropical woods. The purpose of this particular phase of the research program was to determine the amount of absorbed moisture and its distribution pattern when wood is submerged in salt water. Data on 25 tropical American species were presented in the original report and are now supplemented by similar data on 18 additional species. Burma Teak, White Oak, and Douglas Fir were included for comparison, and summary ratings for all 46 species, based on side-grain and over-all moisture absorption, are included. (Author)

**AD-716 740** PC A03 MF A01  
Naval Research Lab Washington DC  
**Biological Deterioration of Wood in Tropical Environments. Part 2. Marine Borer Resistance of Natural Woods over Long Periods of Immersion.**  
Final rept.  
C. R. Southwell, J. D. Bultman, B. W. Forgeson, and C. W. Hummer. 7 Dec 70, 47p Rept no. NRL-7123  
See also Part 1, AD-653 856.

Descriptors: \*Wood, Degradation, \*Tropical deterioration, Wood, \*Marine borers, Wood, Resistance(Biological), Sea water, Identification, Tropical regions, Crustacea, Mollusca, Panama, Trees.  
Identifiers: Teredo, Pholad, Limnoria, Panama Canal Zone, Biological deterioration.

One hundred and fifteen wood species have been exposed to marine borers in three different tropical waters for periods up to 90 months. Underwater sites were in the Panama Canal Zone and included two oceans and a brackish-water lake. Over 30 species of marine-boring organisms were identified from these waters; their extreme activity in the warm tropical environments provided a very thorough screening test for the woods. Samples have been evaluated separately for resistance to the three principal borer classes--teredo, pholad, and



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limnoria. Several of the woods were resistant to one or more of the borer types. Some of these resistant species are relatively unknown as marine construction timbers, and in some instances they proved to be more durable than Greenheart, Teak, and other commercial marine woods. The species most resistant to all borers was *Dalbergia retusa* (Cocobolo), whose oily extract may provide leads to a satisfactory wood preservative. The woods most resistant to each of the different classes of borers are tabulated, with their respective silica content and density included. Silica was shown to be significant only in relation to teredine borers, while wood density was important only with pholads. Woods considered to be of special interest because of findings in the study are discussed individually. (Author)

**AD-717 965** PC A07 MF A01

Bermuda Biological Station St George's West  
**Primary and Secondary Production in the Tropical Atlantic**

Final rept. Aug 67-Sep 69

David M. Steven, Albert L. Brooks, and Euna A. Moore. Dec 70, 132p

Contract N00014-67-A-0432-0001

Prepared in cooperation with Bellairs Research Inst., St. James (Barbados), McGill Univ., Montreal (Quebec), Marine Sciences Centre, and University of the West Indies (Barbados). Dept. of Biology. See also AD-614 791.

Descriptors: \*Ecology, \*Atlantic Ocean, Plankton, Salinity, Fertility, Nutrition, Sea water, Chemical properties, Chlorophylls, Aquatic animals, Periodic variations.

Identifiers: \*Primary biological productivity, \*Biological productivity.

Forty-eight collections were made for a study of primary and secondary production at a station in 460 m of water, between 29 August 1967 and 1 September 1969, and 22 additional collections at 17 deep water stations within a radius of 100 miles from Barbados. Primary production by carbon fixation lacked seasonal variation and annual production was estimated at 117 g C /sq m/year. Predictable seasonal variations were also lacking in concentrations of nutrients and in the composition and quantity of phytoplankton and zooplankton. However evidence was obtained of oscillations with a two to four months' periodicity in the concentration of chlorophyll and the numbers of *Trichodesmium*, which is the most important phytoplankton of the surface waters. This is tentatively ascribed to a short term growth and decay cycle which may be determined by grazing by zooplankton. Additional information was obtained on an inverse correlation between salinity and silicate concentration in the surface water previously reported. The low salinity/high silicate water found off Barbados at various times from January to August appears to originate with the Amazon River outflow and is identified with the fresh water lenses some 500 miles to the east of the island. (Author)

**AD-719 308** PC A02 MF A01

Forest Products Lab Madison Wis

**Proposed Low-Cost Window Unit**

Forest Service research note

B. G. Heebink. Jan 70, 7p Rept no. FSRN-FPL-0211

Descriptors: \*Transparent panels, Design, \*Prefabricated buildings, Transparent panels, Walls, Glass, Plywood, Manufacturing methods, Assembling, Construction materials.

Identifiers: \*Windows, Prefabrication.

The report presents a new concept of a window unit, designed primarily for low-cost houses. The proposed window has permanently mounted glass as the main unit, with a transom ventilating unit above. (Author)

**AD-720 097** PC A02 MF A01

Naval Oceanographic Office Washington D C

**Biology and Distribution of the Yellowfin Tuna in the Tropical Part of Atlantic Ocean (Biologiya i Raspreделение Zheltoperogo Tuntsa (Neothunnus albacora Lowe) v Tropicheskoi Chasti Atlanticheskogo Okeana)**

V. L. Zharov, and Yu. A. Torin. 1971, 14p Rept

no. NOO-Trans-468

Trans. of Atlanticheskii Nauchno-Issledovatel'skii Institut Rybnogo Khozyaistva i Okeanografii. Trudy (USSR) v11 p27-35 1964, by M. Slessers.

Descriptors: \*Fishes, Distribution, \*Marine biology, \*Atlantic Ocean, Abundance, Exploration, Volume, Sea water, Surface temperatures, Salinity, Phosphates, Seacoast, Tropical regions, South America, Africa, USSR.

Identifiers: Translations, \*Tunas, Salt water fishes, \*Animal migrations, Neothunnus albacora.

The paper discusses the Soviet observations of tuna fishes which were carried out in the coastal belt of S America, W Africa and the tropical zone of the Atlantic Ocean during 1959-1962. Since the species consists of two distinct groups, larger and smaller tunas, the distribution, migration and concentrations of these groups are charted separately, pointing out the hydrological conditions that favor the concentrations of these fishes, i.e., the upwelling, convergence and divergence belts, variations of water temperature, salinity and phosphorus content. (Author)

**AD-722 000** PC A02 MF A01

Pennsylvania State Univ University Park

**The Impact of Modernization in The Philippines**

Final technical rept.

George M. Guthrie. Jan 70, 12p

Contract Nonr-656(37), ARPA Order-855

Prepared in cooperation with Ateneo de Manila Univ., Philippines.

Descriptors: \*Philippines, Economics, Reviews, Agriculture, Rural areas, Radio equipment, Jet planes, Television communication systems, Roads, Industries, Education, Police.

Identifiers: \*Developing countries, Surveys, \*Economic development, Modernization.

The report gives a brief summary of the findings of some 34 individual papers which had come from this project as of the end of the contract period. It includes also a brief summary of the collaborative effort between Penn State and Ateneo de Manila University in carrying out and publishing these various papers. Major findings include pervasive social patterns of leveling which tend to diminish the benefit to individuals of innovative efforts but, at the same time, spread the risk of losses. The traditional way of life is maintained because it offers more security than ways which might be considered more modern. These general patterns emerged strongly in studies of farmers, fishermen and market vendors. Other studies were concerned with nutritional status in rural areas and with factors which maintained a level of nutrition in which growth and resistance to infection were adversely affected. Still other studies were concerned with the persistence of traditional patterns in social organization of government structures, particularly the police. (Author)

**AD-723 062** PC A09 MF A01

Arizona Univ Tucson Inst of Arid Lands Research

**Desert Research, II: Selected References 1966-1970**

Technical rept.

Patricia Paylore. Sep 70, 177p\* ES-60

Contract DAAG17-67-C-0199

See also report dated Dec 69, AD-703 884.

Descriptors: \*Deserts, \*Bibliographies, Stratigraphy, Erosion, Wind, Climatology, Plants(Botany), Animals, Structural geology, Hydrology, Tropical regions, Micrometeorology, Geography, Soils, Irrigation systems, Agriculture, Water supplies, Desert tests, Abstracts.

Identifiers: Landforms, Geomorphology, Hydrogeology.

The report consists of 594 references to worldwide desert literature appearing between 1966 and 1970, as located during the period January 1969 to August 1970 in standard abstracting and indexing tools, by continuing searches in sources not so in-

dexed, and by a worldwide network of direct contacts. It is arranged alphabetically by authors, with a brief index of subject geographic terms. Brief abstracts are included, with emphasis on arid lands aspects of such topics as geomorphology, weather and climate, vegetation, fauna, surface materials, hydrology, and geography. (Author)

**AD-724 272** PC A02 MF A01

Forest Products Lab Madison Wis

**Rapid Production of Pallet Deckboards from Low-Grade Logs**

R. A. Hann, R. W. Jakerst, R. S. Kurtenacker, C. C. Peters, and J. L. Tschernitz. 1971, 18p\* Rept no. FSRP-FPL-154

Descriptors: \*Wood, Processing, \*Pallets, Production, Economics, Cutting, Standards, Quality control, Thickness, Drying, Laminates, Adhesives, Aging(Materials), Impact tests, Bending, Acceptability.

Identifiers: Pallet deckboards, Hardwoods.

Low-grade red oak logs were made into satisfactory pallet deckboards in approximately 15 minutes by a process of rotary knife cutting, press drying, and gluing into the final product. Advantages, in addition to speed of processing, were the high yield from low-grade material, and an apparently acceptable end product. (Author)

**AD-724 571** REPRINT

Naval Medical Research Unit No 3 Fpo New York 09527

**Dietary Allowances: An International Point of View**

Technical rept.

Vinayak N. Patwardhan. 1970, 7p Rept no.

NAMRU-3-TR-6-71

Presented at the International Congress of Dietetics (5th), held in Washington, D. C., on 9 Sep 69. Availability: Pub. in Jnl. of the American Dieting Association, v56 n3 p191-194 Mar 70.

Descriptors: \*Nutrition, Standards, \*Diet, Nutrition, Calorimetry, Food, Ingestion(Physiology), Public health, Minerals, Vitamins, Calcium, Vitamin A, Children, Adults.

Identifiers: World Health Organization, Food and Agriculture Organization.

The article reviews the national and international efforts at preparing tables of recommended dietary allowances. The aim of these efforts has been to recommend the levels of consumption of calories and essential nutrients which will ensure good health of most of the people. Recommendations made jointly by Food and Agriculture Organization and World Health Organization for various nutrients have been compared with similar recommendations by other national nutrition bodies in U.S.A., Canada and United Kingdom. Certain differences between the national and international recommendations have been pointed out and the underlying causes discussed. The trend of recommendations for dietary allowances over the last 20 years made by national bodies and international organizations indicates that the differences between the two are gradually diminishing as more knowledge has become available and agreement has largely been reached on the bases on which these recommendations are made. (Author)

**AD-725 600** PC A04 MF A01

Defense Documentation Center Alexandria Va

**Water: Desalination**

Report bibliography Jul 52-Jan 70.

Jun 71, 60p\* Rept no. DDC-TAS-71-28

Descriptors: \*Desalination, \*Bibliographies, \*Distillation, Desalination, \*Osmosis, Desalination, Sea water, Water supplies, Distilling plants, Evaporators, Membranes, Salinity, Cellulose acetates, Sea ice.

Identifiers: \*Reverse osmosis desalination, \*Multistage flash distillation, Potable water.

The bibliography consists of 42 annotated references to reports that were processed in the Defense Documentation Center's data bank covering the period from January 1953 through December 1970. The reports include information on providing fresh water from sea water by means of solar



energy, evaporators, distilling plants and vacuum apparatus. The indexes are corporate author-monitoring agency, and subject.

**AD-726 948** PC A02 MF A01  
Alabama Agricultural Experiment Station Auburn  
**Aquatic Weed Control in Fish Ponds with Chemical Methods**  
J. M. Lawrence. May 67, 13p  
Sponsored in part by the Office of the Chief of Engineers (Army), Washington, D. C. Presented at the World Symposium on Warm-Water Pond Fish Culture held in Rome (Italy) 15-16 May 66.

Descriptors: \*Plants(Botany), Control, \*Lakes, Plants(Botany), Herbicides, Fishes, Toxicity, Algae.  
Identifiers: \*Weed control, Fisheries, \*Aquatic weeds.

Results of aquatic weed control research in fish ponds are reported. A listing of important algae genera and aquatic weed species, information on pond construction features of significance in aquatic weed control, and chemical control techniques are given. Data on fish toxicity and effective rates of application for use under pond conditions are presented for 2,4-D and silvex. (Author)

**AD-727 713** PC A02 MF A01  
Air Univ Maxwell AFB Ala Arctic Desert Tropic Information Center  
**Plant Sources of Water in Southeast Asia**  
Aug 69, 11p Rept no. ADTIC-Information Bull-7-A

Descriptors: \*Plants(Botany), \*Southeast Asia, \*Water, Sources, Instruction manuals, Survival, Identification, Site selection, Tropical regions.

Topics include: How to tap a tree; Cutting water vines; Descriptive data on thirst quenchers.

**AD-730 939** PC A03 MF A01  
Harvard Univ Cambridge Mass East Asian Research Center  
**Production Brigade and Team Management**  
John C. Pelzel. 5 Oct 71, 35p AFOSR-TR-71-2624  
Contract AF 49(638)-1399

Descriptors: \*Management engineering, Production, \*China, Management engineering, Rural areas, Agriculture, Labor.

The report is based on case studies of management practices of twenty rural production teams belonging to one production brigade in southern Kwangtung and Fukien provinces. It describes the way in which Production Brigade and Teams were organized and managed, and the produce distributed. (Author)

**AD-730 952** PC A02 MF A01  
Forest Products Lab Madison Wis  
**Improvements in Solar Dry Kiln Design**  
Forest Service research note  
Eugene M. Wengert. 1971, 10p Rept no. FSRN-FPL-0212  
Prepared in cooperation with Wisconsin Univ., Madison. Master's thesis.

Descriptors: \*Wood, Driers(Apparatus), Solar radiation, Heat transfer, Design, Theses.

The objective of this study was to identify the major energy losses in the solar dryer at Colorado State University, and then to suggest various design changes, based on theoretical considerations, to reduce these losses to leave more energy for the primary task of drying wood. (Author)

**AD-731 719** PC A04 MF A01  
California Univ Berkeley Structural Engineering Lab  
**Solving the Galvanic Cell Problem in Ferro-Cement**  
Interim technical rept.  
Kenneth A. Christensen, and Robert Brady Williamson. Jul 71, 67p Rept nos. UCSESM-71-14, TR-2  
Contract N00014-69-A-0200-1007

Report on Structures and Materials Research.

Descriptors: \*Reinforced concrete, \*Corrosion, \*Electrolytic cells, Reinforced concrete, Cements, Steel, Reinforcing materials, Inhibition, Barrier coatings, Additives, Chromium compounds, Oxides, Construction materials.  
Identifiers: \*Ferrocement, Galvanic corrosion, Chromium oxides.

The nature and constitution of ferro-cement is reviewed with special reference to the structure of cement paste. The microstructure of low water to cement ratio pastes is presented in schematic illustrations to show that a thin paste layer can be used to protect steel reinforcing material from a marine environment. A galvanic cell between the plain steel reinforcing bar and the galvanized steel mesh ordinarily used in ferro-cement is identified. This galvanic cell gives off hydrogen gas at the plain steel reinforcing bar which leads to poor bonding. Possible solutions to this problem are presented and one, the use of chromium trioxide (CrO3) in the mix water, is shown to solve the problem most effectively. This leads to improved mechanical properties as well as a sounder barrier to corrosion of the reinforcement. (Author)

**AD-736 182** PC A03 MF A01  
Naval Research Lab Washington D C  
**Biological Deterioration of Woods in Tropical Environments. Part 3. Chemical Wood Treatments for Long-Term Marine-Borer Protection**  
Final rept.  
C. R. Southwell, and J. D. Bultman. 9 Dec 70, 32p Rept no. NRL-7345  
See also Part 2, AD-716 740.

Descriptors: \*Wood, \*Marine borers, Environmental tests, Oceans, Tropical regions, Crustacea, Molluscacides, Creosote, Arsenic compounds, Copper compounds.  
Identifiers: Teredo, Pholad, Limnoria, \*Biodeterioration, \*Wood preservatives, Copper arsenates, Pine wood, Fir wood.

Six chemical wood preservatives were selected for evaluation over long periods of exposure in extremely borer-active marine environments. Southern Yellow Pine and Douglas Fir were full-cell pressure-treated with these chemicals and exposed in tropical seas and tropical brackish water for periods up to 90 months. Subsequently, 16 of the natural tropical woods considered best for use with pressure preservatives were combined with whole creosote and exposed in the most borer active of the seawater sites for periods exceeding 4 years. All samples have been removed, sectioned, and rated separately for the three major groups of marine borers: teredo, pholad, and limnoria. The long-term results show that heavy treatments of whole creosote and chromated copper arsenate (CCA, type A) are very effective preservatives for Southern Pine exposed in seawater, while the CCA was the singularly most effective treatment against the brackish-water Psiloteredo. Some of the most promising results were obtained with combinations of a few relatively limnoria-resistant tropical woods with a teredo-effective creosote pressure treatment. (Author)

**AD-736 268** PC A03 MF A01  
Forest Products Lab Madison Wis  
**Wood Pallet Manufacturing**  
Forest Service research note.  
1971, 38p\* Rept no. FSRN-FPL-0213

Descriptors: \*Wood, Pallets, \*Pallets, Manufacturing methods, Design, Standards, Classification, Construction, Quality control, Military requirements, Moisture, Weight, Flexural strength, Compressive properties, Defects(Materials), Mechanical fasteners, Plywood, Adhesives, Economics, Production.  
Identifiers: \*Wood pallets, Wood pallet plants.

The report provides fundamental knowledge about wood, its characteristics, and fastenings as related to pallet design and production. Also discusses plant layouts and economics. (Author)

**AD-740 285** PC A03/MF A01  
Army Engineer Waterways Experiment Station Vicksburg Miss  
**Design, Analysis, and Construction of Precast Concrete Elements with Bamboo Reinforcement**  
Eugene F. Smith, and Kenneth L. Saucier. Feb 65, 35p Rept no. AEWES-Misc-Paper-6-705

Descriptors: \*Reinforced concrete, Design, \*Wood, Reinforced concrete, \*Structures, Reinforced concrete, Grasses, Tropical regions, Loading(Mechanics), Deflection, Flexural strength, Feasibility studies, Military requirements, Beams(Structural), Aging(Materials), Tests.  
Identifiers: \*Bamboo reinforced concrete, \*Precast concrete.

The purpose of the research program was to study the feasibility of using bamboo as the reinforcing material in precast concrete elements in tropical and semi-tropical countries. The objectives were to: (1) modify current ultimate strength design and area-moment procedures, as necessary, so that ultimate moments and deflections of bamboo-reinforced concrete elements can be reasonably estimated, and (2) to determine the load-carrying capabilities and deflection limitations of precast concrete flexural elements with bamboo reinforcement under both short-term and sustained loads.

**AD-740 374** PC A05/MF A01  
Forest Products Lab Madison Wis  
**Comparison of Wood Preservatives in Stake Tests**  
Forest Service research note  
L. Gjovik, and H. L. Davidson. 1972, 92p\* Rept no. FSRN-FPL-02/72

Descriptors: \*Wood, \*Protective treatments, Environmental tests, Deterioration, Fungusproofing, Isoptera.  
Identifiers: \*Wood preservatives, Pine wood, Copotermes formosanus, Formosan termites, Biodegradation.

Reported are results on test stakes of southern pine sapwood 2 by 4 by 18 inches in size, treated by pressure and nonpressure processes, in decay and termite exposure in various climates. Also included in some of the tests are smaller pine stakes and those of treated and untreated plywood, modified woods, laminated paper plastic, and pine infected with Trichoderma mold. Preservatives such as coal-tar creosote and petroleum oils containing copper naphthenate, zinc naphthenate, phenyl mercury oleate, and pentachlorophenol have added a few months to 4 years to the life of the untreated stakes. Some waterborne preservatives have provided less protection to the stakes than the standard preservative oils. (Author)

**AD-741 829** PC A04/MF A01  
Human Resources Research Organization Alexandria Va  
**Handbook of Small-Group Methods of Instruction**  
Research product  
Joseph A. Olmstead. May 72, 71p Rept no. HUMRRO-RP-D4-71-27  
Contract DAHC19-70-C-0012

Descriptors: \*Teaching methods, \*Handbooks, Management engineering, Problem solving, Instructors, Transfer of training.

The handbook is designed to assist trainers and training managers to identify methods of instructing small groups (20 students or fewer) to accomplish desired instructional objectives. The emphasis is on methods and procedures rather than on rationale and theory. The material is presented in an outline form, for the trainer to adapt to his needs. Various methods, case discussions, and problem-solving and role-playing exercises are described. (Author)

**AD-742 271** PC A04/MF A01  
Army Engineer Waterways Experiment Station Vicksburg Miss  
**Stronger Concrete**  
Bryant Mather. Oct 66, 60p Rept no. AEWES-Misc-Paper-6-851



Descriptors: \*Concrete, Compressive properties, Construction materials, State-of-the-art reviews, Mixtures, Water, Aging(Materials), Loading(Mechanics), Cements, Costs.  
Identifiers: \*High strength concrete, Aggregates.

The report reviews production methods for producing high compressive strength concrete, and attempts to optimize the ratio of ingredients (with emphasis on minimum water content).

**AD-743 436** PC A02/MF A01  
Army Engineer Waterways Experiment Station  
Vicksburg Miss  
**Design, Analysis, and Construction of Precast Concrete Elements with Bamboo Reinforcement**  
Kenneth L. Saucier, and Eugene F. Smith. Sep 67, 20p Rept no. AEWES-Misc-Paper-6-926

Descriptors: \*Structural parts, \*Reinforced concrete, \*Reinforced concrete, Wood, Loading(Mechanics), Design, Feasibility studies, Structural properties, Military engineering.  
Identifiers: \*Bamboo, Precast concrete.

The purpose was to study the feasibility of using bamboo as the reinforcing material in precast concrete elements. The objectives were to: (1) determine the load-carrying capabilities and deflection limitations of precast concrete flexural elements with bamboo reinforcement under both short-term and sustained loads; and (2) modify current ultimate strength design and area-moment procedures, as necessary, so that ultimate moments and deflections of bamboo-reinforced concrete elements can be reasonably estimated. (Author)

**AD-744 691** PC A03/MF A01  
Forest Products Lab Madison Wis  
**FPL (Forest Products Laboratory) Designs Meet Family Housing Needs**  
Forest Service research paper  
G. E. Sherwood. 1972, 30p\* Rept no. FSRP-FPL-173

Descriptors: \*Housing, Design, Construction, Construction materials, Wood, Foundations(Structures), Costs, Rural areas, Questionnaires.  
Identifiers: \*Low cost housing, \*Rural housing.

The Forest Products Laboratory (FPL) has developed five house plans for low-cost rural houses to demonstrate cost-saving principles of construction. The plans feature simplicity of design, but provide structurally sound houses that fulfill the needs of many families. A questionnaire was mailed to 1,620 individuals who requested and were sent the FPL plans during 1969. A total of 1,129 responded. The replies indicated that 225 houses had been built and that 318 houses were planned for future construction. Ninety-three percent of the reported costs were less than \$12,000; 92 percent indicated incomes of less than \$7,000. In general, the survey results show that structurally sound houses can be built to meet the needs of low-income families at prices they can afford to pay. (Author)

**AD-746 489** PC A02/MF A01  
Northwestern Univ Evanston Ill Dept of Biological Sciences  
**Control of Flies and Cockroaches by Insect Hormones**  
Annual rept. no. 1, 1 Aug 71-31 Jul 72  
Lawrence I. Gilbert. 10 Aug 72, 13p  
Contract N00014-67-A-0356-0024

Descriptors: \*Insect control, \*Hormones, \*Blattidae, Insect control, Blood proteins, Chemical bonds, Labeled substances, Muscidae, Chromatographic analysis, Metabolism, Biochemistry.  
Identifiers: \*Cockroaches, Juvenile hormones, Dopamine, Cuticle, Tanning materials.

The research described deals with two subjects: hormone receptors in insects and the tanning of the insect cuticle. If either process can be interfered with, one would have an effective means of insect control. Receptor studies using sucrose density gradient ultracentrifugation demonstrated the existence of two protein receptors in the crustacean hepatopancreas that bind label from 3H-

ecdysone (molting hormone). Microchemical analysis demonstrated that the label was now due to a previously undescribed ecdysone metabolite. Experiments with the lipoidal juvenile hormone showed that a specific hemolymph (blood) lipoprotein binds 14C-juvenile hormone. Using column chromatography, electrophoresis, and immunological procedures, the author has shown that 14C-dopamine (a central compound in tanning of the cuticle) is metabolized by two different routes in the tobacco hornworm. The immunochemical and radiotracer studies demonstrate for the first time that these hemolymph carrier proteins do indeed traverse the epidermal cell to make their way unaltered into the cuticle undergoing tanning. (Author)

**AD-748 582** PC A03/MF A01  
Naval Civil Engineering Lab Port Hueneme Calif  
**Flexural Strength of Ferro-Cement Panels**  
Technical rept.  
J. E. Tancreto, and H. H. Haynes. Aug 72, 38p\*  
Rept no. NCEL-TR-772

Descriptors: \*Reinforced concrete, Flexural strength, Panels(Structural), Steel, Wire, Reinforcing materials, Fracture(Mechanics), Composite materials.  
Identifiers: \*Ferrocement.

The report studies ferro-cement panels reinforced with plain steel woven wire mesh and subjected to flexural loads to determine the first cracking, visible cracking, and ultimate strength properties. The reinforcement variables were mesh size (which ranged from 2 x 2 to 14 x 14 wires/in.), wire diameter (which ranged from 0.011 to 0.041 inch), and percentage of steel (which ranged from 1 to 3% by area in the direction of principal stress). Control panels of unreinforced mortar and panels reinforced with chicken wire or steel rods were also tested. (Author)

**AD-750 351** PC A02/MF A01  
Army Natick Labs Mass  
**Disposal of Cellulosic Waste Materials by Enzymatic Hydrolysis**  
Mary Mandels, Lloyd Hontz, and Dixon Brandt. 1972, 16p\*

Descriptors: \*Cellulose, \*Decomposition, \*Enzymes, Cellulose, Disposal, Wastes(Industrial), Wastes(Sanitary engineering), Glucose, Hydrolysis, Production, Fungi, Cotton, Paper, Wood.  
Identifiers: \*Biodeterioration, \*Waste disposal, \*Solid waste disposal, Celluloses, Bagasse, Rice hulls, Agricultural wastes, Trichoderma viride.

The paper summarizes studies on pollution abatement by enzymatic conversion of waste cellulose to useful products. Cellulose is the major component of card board boxes, kraft paper, paper bags, correspondence paper, and newspaper, or any other product of wood pulp or cotton. One approach has been the direct conversion of cellulose to animal protein by ruminant feeding, or to single cell protein by growing bacteria or fungi on cellulose. The authors' approach has been a different one. Cellulose was converted to glucose by acid or enzymatic hydrolysis.

**AD-755 424** PC A03/MF A01  
Naval Ship Research and Development Center Bethesda Md  
**Comparison Study of Aluminum, Ferro-Cement, and Fiber-Reinforced Plastic for Small Craft in Korea**  
Benjamin Whang. Dec 72, 37p Rept no. NSRDC-3979

Descriptors: \*Hulls(Marine), Materials, \*Aluminum alloys, Hulls(Marine), \*Reinforced concrete, Hulls(Marine), \*Reinforced plastics, Hulls(Marine), Boats, Glass textiles, Polyester plastics, Physical properties, Costs, Abundance, Manufacturing methods, South Korea, Maintenance.  
Identifiers: \*Ferrocement, \*Fiber composites.

The work compares aluminum, ferro-cement, and fiber-reinforced plastic in terms of small boat construction costs, strength-stiffness/weight characteristics, maintenance, fatigue, impact resistance, fire resistance, etc. within the framework of pres-

ent day Korean technology and economics. (Author)

**AD-758 524** Not available NTIS  
Pennsylvania State Univ University Park  
**A Right to Survive: Subsistence Marketing in a Lowland Philippine Town**  
Maria Cristina Blanc Szanton. Dec 72, 178p  
Contract Nonr-656(37), ARPA Order-855  
Library of Congress Catalog Card no. 72-157769.  
International Standard Book no. 0-271-00555-6.  
Availability: Paper copy available from Pennsylvania State University Press, University Park, Pa. \$8.00.

Descriptors: \*Economics, \*Philippines, \*Commerce, Analysis, Food, Logistics, Sociometrics, Rural areas, Behavior, Management planning.  
Identifiers: Developing countries, Estancia(Philippines), \*Subsistence marketing, Economic development, SD.

A comprehensive analysis is made of the movement of food and supplies from their sources, through middlemen, to consumers in the public market-place of Estancia, Iloilo, a town of 15,000 people located on the northeastern corner of Panay Island in the Philippines. An insight into the social and economic operations of this marketing process--extrapolated to underdeveloped countries throughout the world--suggests action programs for coping effectively with the impediments to progress which lie in many present production and marketing patterns. (Author Modified Abstract)

**AD-759 845** PC A05/MF A01  
Advisory Group for Aeronautical Research and Development Paris (France)  
**Government Assistance for Technical Information in Industry and Simple Mechanization for Small Information Centres**  
Conference proceedings.  
1972, 99p\* Rept no. AGARD-CP-117  
Presented at Meeting of the AGARD Technical Information Panel, (25th) Ankara, Turkey, 23-24 Oct 72. NATO furnished.

Descriptors: \*Technical information centers, \*Industries, Management engineering, Operation, Symposia, Dissemination, Automation, Government(Foreign), Data processing systems, Abstracts, Personnel, Training, Turkey.  
Identifiers: Information transfer, SD.

Contents:  
The present state of information activities in Turkey and future trends;  
Establishing small information centres in industry;  
Library and information services at the Royal Aircraft Establishment -- some problems and their present solutions;  
Training of personnel to man the various parts of an information centre and to operate various kinds of service;  
Microforms - present economics and future use;  
Problems of data recording and data interchange;  
Systemes d'entrees et de recherches pour des centres documentaires de faible ou moyenne importance;  
Presenting a development plan for approval;  
Tailored abstracts and technical digests - a service for industry;  
Information extension services for industry;  
The development and use of a modern data bank.

**AD-760 500** PC A02/MF A01  
Army War Coll Carlisle Barracks Pa  
**Physician's Assistants Role in Health Aid to Developing Nations**  
Student essay  
Alexander M. Boysen. 20 Dec 72, 22p

Descriptors: \*Army, Foreign aid, \*Foreign aid, \*Public health, Medical personnel, Army training, Reviews.  
Identifiers: \*Medical technicians, \*Developing countries, A.

The contention of the essay is to develop the dictum that the United States Medical Department



recognize the challenge and opportunity to contribute to the health delivery systems of developing nations. The training of clinical physician assistants by the Army provides a practical, flexible, and essential means to aid health programs in developing nations when the opportunity exists. Maximum utilization of men, money, and materials must be accomplished if the medical department is to meet the challenge of delivering the product of medical knowledge, technology, and expertise to the benefit of the masses of people in developing nations who desire these benefits. (Author)

**AD-762 552** PC A03/MF A01  
Army Construction Engineering Research Lab  
Champaign Ill  
**Lime-Cement Combination Stabilization**  
Technical manuscript  
Lovick P. Suddath. May 73, 40p Rept no. CERL-TM-M-47

Descriptors: \*Clay, Stabilization, \*Construction, Clay, Density, Cements, Compressive properties, Wear resistance, Army research.  
Identifiers: Soil stabilization, Workability, A.

Soil stabilization is used extensively in road and airfield construction. In particular, soil-cement appears to be a favorite among the engineers. As the plasticity of a soil increases, the ability to adequately mix the cement with the soil becomes a critical factor. Also the quantity of cement required to stabilize the soil becomes excessive. The objective of the study was to determine the effect of reduced compacted density on the durability of cement stabilized clays, pretreated with lime. The reduction in density did not impair the durability of cement stabilized clay soils, which were pretreated with lime. Most of the test results indicated an improved resistance to freeze-thaw. An evaluation of the unconfined compressive strength results obtained during freeze-thaw shows that lime pretreatment improved the strengths. (Modified author abstract)

**AD-764 294** PC A08/MF A01  
Forest Products Lab Madison Wis  
**Veneer Species of the World**  
1973, 155p\*

Descriptors: \*Wood, Reviews, Tables, Plywood, Trees, Sources.  
Identifiers: \*Veneers, Inventories, FPL.

The report is a compilation of veneer properties from several hundred wood species. Most of the data presented comes from research conducted in government laboratories in a half dozen nations. Additional information was obtained from contacts with the veneer and plywood industry. Presented are tables with the species by botanical name, common names, the name of the country supplying the data, and some of the properties of the wood.

**AD-765 437/9** PC A08/MF A01  
Army Engineer Waterways Experiment Station  
Vicksburg Miss  
**Aquatic Plant Control Program. Technical Report 4. Herbivorous Fish for Aquatic Plant Control**  
Final rept.  
Edward O. Gangstad, Julian J. Raynes, Ralph M. Burress, John Stanley, and Kermit Sneed. Jun 73, 154p\*  
See also AD-759 500.

Descriptors: \*Plants(Botany), Control, \*Fishes, \*Pest control, \*Inland waterways, Plants(Botany), Ecology, Food, Removal, Efficiency, Digestive system, Nutrition, Test methods, Florida.  
Identifiers: Ctenopharyngodon idella, \*Herbivorous fishes, \*Aquatic weeds, \*Weed control, \*Biological pest control, A.

During the last decade, research to discover means of controlling obnoxious aquatic plant growth has included evaluation of various species of herbivorous fishes. Two of the species studied, Israeli carp and the white amur fish, have shown sufficient efficacy to offer promise for utilization in controlling aquatic weeds in habitats occupied by established game fish populations. The Israeli carp

was only effective in controlling filamentous algae and is useless for control of rooted aquatic plants. The white amur fish, on the other hand, has shown great promise in controlling submersed and emerged types of plants. The purpose of this research report was to determine the efficiency of the white amur fish (Ctenopharyngodon idella) as a biological control agent for aquatic weed populations in natural habitats, with evaluation of the effects of space and plant nutrients resulting from the destruction of weeds in the aquatic ecosystem. This research information provides the basis to establish a system of knowledge for control and operational procedures for use of white amur fish for aquatic plant control. (Author)

**AD-765 616/8** PC A03/MF A01  
Army War Coll Carlisle Barracks Pa  
**Administrative Aspects of Urbanization in Developing Countries**  
Monograph  
Eugene R. Brady. 20 Mar 72, 31p

Descriptors: \*Management planning, \*Urban areas, \*Government(Foreign), Problem solving, Management engineering, Organizations, Dynamics, Urban planning, Reviews, Analysis, Natural resources.  
Identifiers: \*Urbanization, \*Developing countries, Policies, Participative management, A.

The report deals primarily with administrative problems associated with urbanization in developing countries. Approaches to these problems are discussed in the following areas: organizational structures and relationships, management of resources, participation and representation, urban plans and policies, and institutional aids. (Author)

**AD-765 702/6** PC E04/MF A01  
Naval Postgraduate School Monterey Calif  
**Leadership through an Understanding of Human Motivation with Special Application to a Partially Industrialized Country**  
Master's thesis  
Ali Saraf-Yazdy. Jun 73, 87p

Descriptors: \*Leadership, Analysis, \*Motivation, Management control systems, Group dynamics, Classification, Psychometrics, Theory, Reviews, Theses.  
Identifiers: Developing countries, Participative management, Human needs, N.

Management includes the functions of planning, organizing, directing, controlling and staffing. The function of directing includes the skill of leadership. A manager is charged with carrying out all of the functions of management. Some authorities have said that managers should be leaders but leaders need not be managers. There has been confusion concerning these terms because of their wide interchangeable use, and they are used interchangeably in this paper but for clarity when the terms manager or management are used they refer to that part of management which involves getting things done through people.

**AD-767 566/3** PC A04/MF A01  
Forest Products Lab Madison Wis  
**Principles for Protecting Wood Buildings from Decay**  
Forest Service research paper  
T. C. Scheffer, and A. F. Verrall. 1973, 59p\* Rept no. FSRP-FPL-190

Descriptors: \*Buildings, Wood, \*Wood, Protection, \*Preservation, Buildings, \*Degradation, Wood, Construction materials, Fungus deterioration, Moisture, Foundations(Structures), Walls, Floors, Roofs, Impregnation.  
Identifiers: FPL.

Problems caused by decay in buildings in the United States and the means to avoid or control them are dealt with in this work. The principal moisture situations and construction features most responsible for the occurrence of decay in various building parts are described, and directions are given for approximately modifying or eliminating undesirable conditions. Emphasis throughout is on the two primary means of protecting against decay: (1) The use of dry wood and of construction

methods to keep wood dry, and (2) methods to treat wood with a suitable preservative in areas where dry conditions cannot be maintained.

**AD-769 470/6** PC A19/MF A01  
Army Foreign Science and Technology Center  
Charlottesville Va  
**Glass Technology**  
L. M. Butt, and V. V. Pollyak. 28 Aug 73, 450p\*  
Rept no. FSTC-HT-23-0660-73  
Trans. of mono. Tekhnologiya Stekla, Moscow, 1971 367p.

Descriptors: \*Glass, Technology, Manufacturing, Melting, Production, USSR, Translations.  
Identifiers: A.

The essentials of making glass and glass articles are examined. Properties of glasses and glass melts are discussed. Raw materials, their preparation, batch preparation, and the glassmaking process in various kinds of furnaces is described. Emphasis is placed on the production of sheet, polished, and architectural-structural glass, and slag pyroceramics. (Author) Portions of this document are not fully legible.

**AD-771 700/2** PC A12/MF A01  
Defense Documentation Center Alexandria Va  
**Fungusproofing**  
Report bibliography Dec 43-Aug 72.  
Dec 73, 265p\* Rept no. DDC-TAS-73-72  
Supersedes AD-720 202.

Descriptors: \*Fungicides, \*Bibliographies, Fungusproofing, Moistureproofing, Weatherproofing, Plastics, Textiles, Microorganisms, Coatings, Fungus deterioration, Paper, Composition board, Wood, Humidity.  
Identifiers: SD.

The bibliography is a collection of references relating to fungusproofing as it pertains to industrial processing. The process of weatherproofing, coating, moistureproofing, fungus deterioration, and fungicides are discussed. Corporate Author-Monitoring Agency, Subject, Title, and Personal Author indexes are included. (Author)

**AD-772 930/4** PC A02/MF A01  
Army Natick Labs Mass  
**The Acceptability of Whey-Soy Mix as a Supplementary Food for Pre-School Children in Developing Countries**  
Technical rept.  
W. I. III Rodier, W. C. Wetsel, H. L. Jacobs, R. C. Graeber, and H. R. Moskowitz. Dec 73, 21p\*  
Rept no. USA-NLABS-TR-74-20-PR

Descriptors: \*Milk, \*Food, \*Children, Acceptability, Beverages, Army research.  
Identifiers: Developing countries, A.

Testing of a whey-soy beverage powder was carried out in Chile, Vietnam, India, Pakistan, Sierra Leone and the Dominican Republic to determine its probable acceptability for use as a supplementary food for pre-school children. Test results indicated that the beverage powder should be acceptable in all test countries except possible Sierra Leone. Moreover, since the tests were carried out in a variety of geographical areas and cultures and in several types of distribution systems, it may be concluded that there is a high probability that the beverage powder will be acceptable in pre-school child feeding programs in most parts of the developing world.

**AD-774 720/7** PC E01/MF A01  
California Univ San Francisco George Williams  
Hooper Foundation  
**The Biological Control of Schistosomiasis: A Program to Develop Use of Trematode Interactions in the Snail Host in Conjunction with the Molluscicide Endos as a New Approach to the Control of Human Schistosomiasis in Egypt and Ethiopia**  
Final rept. Aug 72-Oct 73  
Donald Heyneman, and Harry G. Lee. 31 Dec 73, 33  
Contract N00014-69-A-0200-2005



Descriptors: \*Schistosomiasis, \*Trematodes, \*Gastropoda, Schistosoma, Parasitic diseases, Parasites, Molluscacides, Egypt, Ethiopia. Identifiers: \*Biological pest control, Echinostomata, Host parasite relations, N.

A series of 25 field stations were established from which 4000 snails were collected. These snail hosts serve as hosts of both of the endemic schistosome species (*Schistosoma haematobium* from *Bulinus truncatus*, *Bu. abyssinicus*, *Bu. sericus*, and *Bu. forskalii*; and *S. mansoni* from *Biomphalaria pfeifferi*) and a number of possible trematode antagonists among the echinostome species found parasitizing these snails. About 75 collections of cercariae were made and analyzed. A species of 43-spined *Echinoparyphium* proved to be a widespread parasite in the various forms of *Bulinus* collected both in Ethiopia and Egypt. Efforts to develop this species as a biological control of *S. haematobium* are underway. Factors required for successful biological control are described and discussed.

**AD-775 408/8** PC A08/MF A01  
Army Engineer Waterways Experiment Station  
Vicksburg Miss  
**Aquatic Plant Control Program. Technical Report 6. Biological Control of Water Hyacinth with Insect Enemies**  
Final rept.  
Edward O. Gangstad, Julian J. Raynes, Charles F. Zeiger, Jean M. Ingersoll, and Robert D. Gordon. Jan 74, 156p\*  
See also report dated Oct 73, AD-769 583.

Descriptors: \*Aquatic plants, \*Beetles, Control, Ecology, Coleoptera, Insects.  
Identifiers: *Neochetina eichhorniae*, \*Biological weed control, \*Weed control, A.

Present water hyacinth control programs provide at best only short-term control, and thus are of short-term benefit as far as productivity of the environment is concerned, whereas successful biological control will provide long-term benefits to productivity, with a concomitant reduction in the use of chemical or mechanical disturbances of the environment. Once a biological control agent is established, it becomes an integral part of the environment and as such may properly be considered a self-renewable resource, and a beneficial addition to our environment. It is a hope that *Neochetina eichhorniae* will prove to be just that, and that it will, alone or in conjunction with other native or introduced natural enemies, bring about the alleviation of the problems caused by water hyacinth in the southeastern United States. (Author)

**AD-777 404/5** PC A02/MF A01  
Naval Medical Research Unit No 2 Taipei (Taiwan)  
**Abstracts of Papers Presented by Staff of NAMRU-2 at the International Congress of Tropical Medicine and Malaria (9th), Held in Athens (Greece) on 14-21 October 1973**  
Jan 74, 5p Rept no. NAMRU-2-IR-32

Descriptors: \*Meetings, \*Parasitic diseases, \*Tropical diseases, Greece, Abstracts, Trematodes, Helminthic diseases, Schistosomiasis, Filariasis, Nematoda, Indonesia, Disease vectors, Hosts(Biology), Parasites.  
Identifiers: *Fasciolopsis buski*, *Capillaria philippinensis*, *Echinostomiasis linfoensis*, N.

Contents:  
Results of skin testing for trematode infections on Taiwan;  
The in vitro cultivation of *Fasciolopsis buski* (Lankester);  
Antigen analysis of *Fasciolopsis buski* (Lankester);  
*Schistosomiasis* in Indonesia, ecological and zoonotic aspects;  
*Filariasis* in transmigratory settlements of Indonesia;  
Zoonotic aspects of *Capillaria philippinensis*; Mammals and their parasites in Gumbasa Valley, Central Sulawesi, Indonesia;  
*Schistosomiasis* in Indonesia, human aspects;  
*Echinostomiasis linfoensis*: a disease that disappeared.

**AD-778 846/6** PC A21/MF A01  
Informatics Inc Rockville Md  
**Solar Energy**  
Vlastimir A. Stevovich. 1 Mar 74, 478p\* AFOSR-TR-74-0600  
Contract F44620-72-C-0053, ARPA Order-1622-4

Descriptors: \*Solar energy, Energy conversion, Power, Energy, Energy storage, Collection, Solar heating, Utilization, USSR, Power supplies, Reviews.

The report is a comprehensive review of present major developments and future planning in various fields of applied solar engineering. The study covers theoretical and experimental data on the background and state-of-the-art of applied solar research in general, with emphasis on foreign work, particularly in the Soviet Union. (Author)

**AD-780 061/8** PC A06/MF A01  
Advisory Group for Aerospace Research and Development Paris (France)  
**How to Obtain Information in Different Fields of Science and Technology: A User's Guide**  
Lecture series.  
1974, 124p\* Rept no. AGARD-LS-69  
NATO furnished.

Descriptors: \*Information centers, Information processing, Information, Flow, Global, Distribution.  
Identifiers: Information dissemination, Lectures.

The purpose of the series is to outline for the user of information systems the principles upon which such systems are based, and thus enable him to understand and more readily exploit their potentialities. The series includes presentations of general information on this subject and more detailed examples of specific scientific, medical and governmental systems.

**AD-781 403/1** PC E05/MF A01  
Naval Postgraduate School Monterey Calif  
**Fatigue of Ferro-Cement**  
Master's thesis  
Michael G. Simpson. Jun 74, 119p

Descriptors: \*Reinforced concrete, \*Fatigue(Mechanics), Ship hulls, Stresses, Test methods, Fracture(Mechanics), Electron microscopy, Theses.  
Identifiers: \*Ferrocement, \*Wire cloth, Scanning electron microscopy.

Ferro-cement is a cement mortar with a high relative volume of well dispersed steel wire reinforcement. The material properties of ferrocement are neither those of the mortar alone nor of the reinforcement and vary as the mortar and reinforcement configurations are changed. In this study, several variations of ferro-cement were fabricated and subjected to constant amplitude cyclic loads up to ten million cycles. Stress versus cycles-to-failure plots were developed and comparisons between the data for various ferro-cement modifications were made. Monotonic tests were conducted on the ferro-cement to allow comparisons with work conducted by other experimenters. An investigation of the fracture surface was conducted using a scanning electron microscope. (Author)

**AD-782 199/4** PC A04/MF A01  
Asian Inst of Tech Bangkok (Thailand)  
**Investigation of Rational Effluent and Stream Standards for Tropical Countries**  
Annual rept. 1 Nov 71-30 Apr 73  
Mainwaring B. Pescod. 28 May 74, 61p ARDG/FE-476-2  
Grant DA-RDRF-S92-544-72-G179

Descriptors: \*Water pollution, \*Water supplies, \*Streams, \*Southeast Asia, Standards, Quality, Irrigation systems, Sewage treatment, Drinking water, Oxygen, Fishes, Oxidation, Waste water, Costs, Thailand.  
Identifiers: \*Water quality standards, Oxidation lagoons, Developing countries.

Water quality standards were reviewed and tentative stream standards proposed for use in developing countries of Southeast Asia on the basis of legitimate water uses and adaptation of available

data to local conditions. A survey of stream standards and water uses applied in the Southeast Asian region indicated that few countries had adopted standards and practically no attempt had been made to adjust to suit local conditions. Experimental studies suggested that oxidation pond effluent would have a beneficial effect on the oxygen balance of a stream under tropical conditions provided that the algal concentration was not more than 10,000 cells/ml after dilution in the stream. Oxidation ponds were assessed as being more attractive than either trickling filter or activated sludge treatment plants for populations less than 175,000 and land rental costs of U.S. \$0.10 per square meter per year or less. (Author)

**AD-784 092/9** PC A03/MF A01  
Army Construction Engineering Research Lab Champaign Ill  
**The Use of Coral as an Aggregate for Portland Cement Concrete Structures**  
Final rept.  
P. A. Howdysshell. Jun 74, 43p\* Rept no. CERL-TR-M-88

Descriptors: \*Construction materials, \*Coral, Concrete, Construction, Structures, Deterioration, Military engineering, Pacific Ocean Islands.  
Identifiers: \*Aggregates(Materials), Evaluation.

The investigation documents the experience gained by the Corps of Engineers and the Navy since World War II in the use of coral as an aggregate for portland cement concrete. The approach was to evaluate relevant literature and construction and inspection records, visit construction and material preparation sites, evaluate existing coral concrete structures, and analyze coral aggregate and coral concrete samples in the laboratory. The results of the investigation indicate that coral has successfully been used as an aggregate for concrete in vertical construction. The only significant type of deterioration observed in coral concrete structures was the cracking and spalling of concrete associated with corroding reinforcing steel. The severity of the corrosion-spalling problem was sufficient in some cases to affect structural integrity, while in other cases little or no deterioration was observed. For the most part specifications and construction techniques currently being used for production of coral aggregate and coral concrete are similar to specifications and techniques for conventional aggregate and concrete. (Author)

**AD-784 557/1** PC A03/MF A01  
Forest Products Lab Madison Wis  
**Properties of Particleboards at Various Humidity Conditions**  
Forest Service research paper  
J. Dobbin McNatt. 1974, 26p\* Rept no. FSRP-FPL-225

Descriptors: \*Fiberboard, \*Wood, \*Humidity, Stresses, Moisture, Flexural strength, Elastic properties, Compressive properties, Bending, Loads(Forces), Exposure(General), Degradation, Stiffness, Drying, Tables(Data).  
Identifiers: \*Particleboards, Design.

The changes in properties of particleboard that result from changes in moisture content should be determined to avoid possible problems related to linear expansion and thickness swelling and to loss in load-carrying capacity and stiffness. In this report the physical and mechanical properties are determined for five commercial particleboards manufactured primarily from planer shavings and for a board made at the Forest Products Laboratory from random-width Douglas-fir flakes, 1 inch long and 0.015 inch thick. All were conditioned at humidity exposures between oven-dry and 90 % relative humidity. (Modified author abstract)

**AD-785 748/5** PC A03/MF A01  
Trinity Coll Dublin (Ireland) School of Engineering  
**Investigation of Stress Concentration in Reinforced Concrete Components**  
Final technical rept. 1 Jun 73-31 May 74  
T. E. Glynn, and M. Z. Al-Salihi. Jun 74, 26p  
Grant DA-ERO-591-73-G-0041



# APPROPRIATE TECHNOLOGY ABSTRACTS

Descriptors: \*Reinforced concrete, \*Stresses, Static tests, Dynamic tests, Crack propagation, Formulations, Ireland.  
Identifiers: \*Ferrocement.

This report is a continuation of the former efforts to elucidate the behavior of ferrocement concrete in static and dynamic stress fields. The influence of various reinforcements on pre and post cracking of thin sections forms the main topic of this report. The objects of the testing program were to compare the effectiveness of various steel mesh configurations in arresting crack propagation in stressed members; to provide experimental data for checking theoretical predictions of strength based on material parameters; to identify areas of future research potential. The work to date has been devoted to flexural and direct tensile tests on thin slabs. The slabs were reinforced uniformly with steel meshes of various patterns. The matrix consisted of microconcretes, and some variations in the mix design were incorporated.

**AD-785 928/3** PC A03/MF A01  
Romualdi (James P) Pittsburgh Pa  
**Ferrocement Developments in New Zealand**  
James P. Romualdi. May 74, 36p  
Contract N00167-74-C-0171

Descriptors: \*Ship hulls, \*Boats, \*Cements, Production, New Zealand.  
Identifiers: \*Ferrocement.

During the period August 1973 to January 1974, the author was associated with a local firm which is engaged in marine and terrestrial ferrocement activities. These activities provided an opportunity to assess the potential of ferrocement as well as the undertaking of tests of new hull construction techniques that combine ferrocement with steel fiber reinforced mortar. This report summarizes current development, assesses current potential of the material, presents the results of the test series, and ends with recommendations for future development. This report does not attempt to review the general state-of-the-art of ferrocement hull construction.

**AD-787 465/4** PC-GPO/MF A01-NTIS  
Department of the Army Washington D C  
**Africa: A Bibliographic Survey of Literature**  
1973, 623p\* Rept no. DA-PAM-550-17  
Availability: Paper copy available from GPO.

Descriptors: \*Africa, \*Bibliographies, Handbooks, Political science, Sociology, Economics, Military forces(Foreign), Military organizations, Transportation, Communication and radio systems, Literature surveys.  
Identifiers: Developing countries.

Like the previous volume on the subject (DA PAM 550-5) which was issued in April 1967, the new edition endeavors to assess the problems and prospects in the vast continent. The difficulties and accomplishments are looked at from both--a broad, regional point of view, as well as from a specific, national point of view. The work includes data on the strategic importance of Africa as a continent, and also provides facts and figures on the political, sociological, economic, and military aspects that contribute to the viability of individual African states. More than four thousand books, periodical articles, and monographs, were searched in the preparation of this work. The body of material is supported by 91 appendixes and 53 maps, of which 18 are in color.

**AD-837 454/8** PC A02/MF A01  
Army Biological Labs Frederick MD  
**Rice Cultivation in North Vietnam**  
27 Jul 65, 16p Rept no. Trans-1498  
Trans. of mono. Futsuryo Indo Shina Nogyo Keizai (Agricultural Economy in Indochina) Tokyo, 1942 p1-14.  
Distribution limitation now removed.

Descriptors: \*Cereals, Vietnam, Rural areas, Rivers, Soils, Plants(Botany), Seeds, Production, Statistical analysis, Irrigation systems, Agriculture.  
Identifiers: North vietnam, Rice, Translations.

The report discusses rice culture in North Vietnam. Varieties of rice, soils and regional characteristics of rice culture are examined.

**AD-837 489/4** PC A02/MF A01  
Army Biological Labs Frederick MD  
**Notes on the Duration of Evolution of Varieties of Rice Cultivated in Indochina**  
Yves Coyaud. Jul 68, 14p Rept no. Trans-1443  
Trans. from Agronomie Tropicale (France) v3 n5-6 1948.  
Distribution limitation now removed.

Descriptors: \*Cereals, Vietnam, Rural areas, Plants(Botany), Climate, Transplantation, Soils, Acclimatization, Economics, Terrain, Irrigation systems, Agriculture.  
Identifiers: Rice, Translations.

The report discusses the varieties of rice grown in present day Vietnam. Influence of soils, climate and plant strains upon rice production are examined.

**AD-837 490/2** PC A02/MF A01  
Army Biological Labs Frederick MD  
**Conditions of the Culture of Rice in the High-Donnai (Vietnam)**  
P. Bertrand. 1952, 18p Rept no. Trans-1444  
Trans. of Agronomie Tropicale (France) v7 n3 p266-275 1952.  
Distribution limitation now removed.

Descriptors: \*Cereals, Vietnam, Commerce, Rural areas, Forestry, Seeds, Plants(Botany), Soils, Manpower, Climate, Irrigation systems.  
Identifiers: Rice, Translations.

The report discusses the more primitive agricultural practices of the mountain peoples of Vietnam. The methods of rice culture, forest clearing and soil preparation are examined.

**AD-837 491/0** PC A02/MF A01  
Army Biological Labs Frederick MD  
**Work That the Indochinese Rice Office Has Accomplished**  
Paul Carton. 1955, 10p Rept no. Trans-1445  
Trans. of Riz et Riziculture et Cultures Vivrieres Tropicales (France) v1 n1 p26-29 1955.  
Distribution limitation now removed.

Descriptors: \*Cereals, Vietnam, Rural areas, Southeast asia, Research management, Plants(Botany), Agriculture.  
Identifiers: Rice, Translations.

No abstract available.

**AD-837 492/8** PC A02/MF A01  
Army Biological Labs Frederick MD  
**Production and Distribution of the Rice Seeds in Vietnam**  
1956, 5p Rept no. Trans-1446  
Trans. of Riz et Riziculture et Cultures Vivrieres Tropicales (France) v2 n4 p309-310 1956.  
Distribution limitation now removed.

Descriptors: \*Cereals, Vietnam, Rural areas, Seeds, Production, Plants(Botany), Research management, Agriculture.  
Identifiers: Rice, South vietnam, Translations.

No abstract available.

**AD-837 495/1** PC A02/MF A01  
Army Biological Labs Frederick MD  
**Some Aspects on the Production of Rice Problem in Vietnam**  
1960, 12p Rept no. Trans-1448  
Trans. of Causeries Development Resources Nat. Vietnam Soc. Etat. Agr. (sic) n12 p9-22, 5 Oct 60.  
Distribution limitation now removed.

Descriptors: \*Cereals, Vietnam, Commerce, Rural areas, Fertilizers, Seeds, Economics, Irrigation systems.  
Identifiers: Rice, South vietnam, Translations.

The report discusses rice growing in South Vietnam. Commercial, export and technical problems

are discussed as well as means for increasing crop yields.

**AD-837 496/9** PC A03/MF A01  
Army Biological Labs Frederick MD  
**The Problem of Fertilizers in Rice-Growing in South Vietnam**  
Doan Khac Vuong. 1952, 40p Rept no. Trans-1450  
Trans. from Indochinese Rice Office. Archives (sic) n36 1952.  
Distribution limitation now removed.

Descriptors: \*Cereals, Vietnam, Rural areas, Production, Climate, Seeds, Soils, Chemical analysis, Fertilizers, Plants(Botany), Research management, Agriculture.  
Identifiers: Rice, South vietnam, Translations.

The report presents a study of the practices concerning use of fertilizers in the rice growing zones of South Vietnam. The present and recommended uses of fertilizers are discussed.

**AD-837 497/7** PC A02/MF A01  
Army Biological Labs Frederick MD  
**Campaign for Improvement in Cooperative Management -- Second Stage**  
Ha Dang. 23 Jun 65, 4p Rept no. Trans-1500  
Trans. of Khoa Hoc Ky Thuat Nong Nghiep (sic) (North Vietnam) p22-23, 15 Nov 63.  
Distribution limitation now removed.

Descriptors: \*Management planning and control, Agriculture, \*Agriculture, Vietnam, Food, Cereals, Swine, Rural areas, Propaganda, Communism, Political science, Fertilizers, Seeds, Irrigation systems.  
Identifiers: North vietnam, Rice, Translations.

The report discusses ways of improving food production in a small North Vietnamese cooperative farm.

**AD-863 643** PC A03/MF A01  
Fort Detrick, Frederick, Md.  
**Peanut Rust: A Review of Literature**  
Kenneth R. Bromfield. Dec 69, 26p Rept no. SMUFD-Misc Pub-36  
Distribution Limitation now Removed.

Descriptors: \*Puccinia(Rusts), Reviews, \*Plants(Botany), Diseases, Pathology, Fungi, Life cycle, Epidemiology, Control, Central America, Caribbean sea, South America, United States.  
Identifiers: \*Peanut plants, Puccinia arachidis, Arachis hypogaea.

On plants subjected to early and intensive rust attack, leaves fail to attain normal size and fall to the ground prematurely, growth of the shoot is slowed, the life cycle of the plant may be shortened by more than 15 to 20 days, and the seeds that are produced may be smaller and lower in oil content. (Author)

**AD-878 676/6** PC A03/MF A01  
Naval Ship Research and Development Lab Annapolis MD  
**State-of-the-Art Survey of Ferrocement**  
Research and development rept.  
Frank E. Brauer. Jan 71, 38p Rept no. NSRDL/A-8-529  
Distribution limitation now removed.

Descriptors: \*Cements, \*Reinforced concrete, \*Composite materials, Cements, \*Construction materials, Ships, Wire, Reinforcing materials, Tensile properties, Flexural strength, Modulus of elasticity, Fatigue(Mechanics), Compressive properties, Shear stresses, Corrosion resistance, Impact shock, Mechanical properties, Shock resistance, State-of-the-art reviews, Cracks, Ductility, Steel, Bonding, Corrosion inhibition.  
Identifiers: \*Ferrocement, Portland cement.

From this literature study it was found that ferrocement is a composite material of superior mechanical properties when compared to reinforced concrete. This superiority is reflected in greater flexural crack strength, tensile strength, ductility, and impact strength. Much more research into the ma-



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terial properties of ferrocement must be done to fully understand the nature of the strengthening mechanism in ferrocement and to provide designers with comprehensive, reliable information necessary for the maximum utilization of ferrocement. (Author)

**BMFT-FB-T-77-06** PC A04/MF A01  
Dornier-System G.m.b.H., Friedrichshafen (West Germany).  
**Glue Stock from Leather Production. Final Report**  
K. Purps. Jul 77, 55p  
U.S. Sales Only.

Descriptors: \*Industrial wastes, \*Leather, Economics, Environmental effects, Processing, Recycling, Waste processing.  
Identifiers: ERDA/320305, West Germany, \*Solid waste disposal, \*Tanneries, Waste recycling, Hides.

The low-collagen, limed inner hide layer obtained in tanneries is not recommended for reuse in the hide gluing industry both from the economic and the environmental standpoint. Therefore, it is proposed to have the flesh removed from the unlimed raw hide in the slaughterhouses. The tanneries are thus relieved of their burden of waste discharge, and the animal carcass-rendering companies can benefit from an additional valuable raw material. (ERA citation 03:031271)

**BMI-1957(V.3)** PC A09/MF A01  
Battelle Columbus Labs., Ohio.  
**Systems Study of Fuels from Sugarcane, Sweet Sorghum, and Sugar Beets. Volume III. Conversion to Fuels and Chemical Feedstocks. Task 77. Final Report**  
E. S. Lipinsky, R. A. Nathan, W. J. Sheppard, and J. L. Otis. 31 Dec 76, 183p  
Contract W-7405-ENG-92

Descriptors: \*Ammonia, \*Chemical feedstocks, \*Ethanol, \*Furfural, \*Sugar cane, Acetic acid, Acid hydrolysis, Anaerobic digestion, Bagasse, Biosynthesis, Comparative evaluations, Cost, Economics, Fermentation, High btu gas, Industrial plants, Liquids, Residues, Thermochemical processes.  
Identifiers: ERDA/140504, ERDA/090222, ERDA/090122, ERDA/090320, \*Refuse derived fuels.

Information developed in field interviews and literature research which form the basis of extensive calculations that pertain to numerous alternative means of converting the sugar crops into fuels and chemical feedstocks is reported. Investigation of numerous candidate fuels and chemical feedstocks that might be made from sugar crops indicates that ethanol and ammonia are the most promising. The projected cost of ethanol by use of well-established fermentation technology on juice extracted from sugarcane or on molasses is expected to be quite close to that projected for ethanol from natural gas liquids or petroleum by 1980. The ammonia market is substantial (17 million tons), but this key fertilizer and chemical product is expected to cost close to \$200 per ton when made from sugar crop residues, well above what ammonia made from natural gas at \$3 per million Btu costs. However, sugarcane-based ammonia might compete well with coal-based ammonia. Sugarcane appears to be the most promising sugar crop for conversion to fuels and chemicals in the short and intermediate term. The costs of sugarcane juice and bagasse are lower than for the corresponding sugar beet products. Of the sugar crops, sweet sorghum has the greatest long-range appeal for the United States because the crop can grow over a much wider geographical range than can sugarcane. The development of processes to manufacture ammonia, methanol, acetic acid, and thermochemical substitute natural gas (SNG) from sugar crop residues depends on technology to generate synthesis gas. Sugarcane bagasse appears to be the most economic source of furfural. Anaerobic digestion of sugarcane or sugarcane-containing juices to SNG is ruled out on economic grounds. The principal findings of the conversion aspects of the research are summarized quantitatively. Alternative routes for conversion of sugar crops to fuels and chemicals are presented. (ERA citation 03:006207)

**BNL-20510** PC A02/MF A01  
Brookhaven National Lab., Upton, N.Y.  
**Energy Institute for Developing Countries: A Working Paper.**  
P. F. Palmedo, and R. Nathans. May 74, 12p

Descriptors: \*Developing countries, Energy sources, \*Energy supplies, Planning, \*Energy policy, Charges, Distribution, Economic development, Energy supplies, Forecasting, Production, Simulation.  
Identifiers: ERDA/293000, ERDA/292500, ERDA/293800.

The volatility of energy prices, as well as the precariousness of international energy supply, is forcing many developing countries to consider new ways to satisfy their energy needs over the next several decades. As a result it is likely that major changes in energy production - distribution systems will occur in large numbers of these countries. A necessary component of the important decisions these countries must make, e.g., with respect to changes in plans for their economic development or the introduction of new technologies, is the need to assess the alternatives and plan for their country's current and future energy needs. This working paper discusses the establishment of an Energy Institute for Developing Countries, whose major function would be to assist and work with interested countries in the performance of energy planning and assessment analyses. Other areas to be covered by the Institute include: (1) preparation of methodologies for evaluation and assessment of new technologies for individual countries; (2) generation of data bases of technical coefficients; (3) provision of user manuals, training of technical personnel and extensive consultations with appropriate government officials in developing countries; and (4) support to agencies and organizations in the U.S. concerned with energy problems in developing countries. The paper discusses the need for and characteristics of a comprehensive energy planning and assessment framework, and a scheme for micro and macro assessments of alternative energy technologies. It also lists a series of specific mechanisms for developing appropriate models and data bases, and transferring the results to interested developing countries.

**BNL-21491** PC A02/MF A01  
Brookhaven National Lab., Upton, N.Y.  
**Single Technology Pitfall**  
J. G. Cottingham. 76, 9p Rept no. CONF-760657-1  
Contract E(30-1)-16  
New England solar energy conference, Amherst, Massachusetts, United States of America (USA), 24 Jun 1976.

Descriptors: \*Solar energy, \*Tower focus collectors, Cost, Economic development, Solar collectors.  
Identifiers: ERDA/140300.

As a first step toward cost reduction six principles are suggested to enhance the solar energy cost picture: use solar energy as a supplement; find a year round application for your collector system; reduce the material content per unit area of collector; generate higher temperatures - make better use of second law of thermodynamics; develop commercial size air conditioning units first for economy; and adapt solar energy to current energy handling technology. The "baby power tower" collector at Brookhaven is sketched and used to illustrate these principles. (ERA citation 02:033915)

**BNL-21874** PC A02/MF A01  
Brookhaven National Lab., Upton, N.Y.  
**Brief Description of the Developing Country Energy Project**  
1 Oct 76, 7p  
Contract EY-76-C-02-0016

Descriptors: \*Developing countries, \*Energy demand, \*Energy supplies, Economics, Energy storage systems, Socio-economic factors, Systems analysis, Technology assessment.  
Identifiers: ERDA/292000, ERDA/293000, India, Kenya, Ghana, South Korea, Chile, Brazil, Greece, Energy models.

The objective of the project is to assess the role of new or adapted technologies in addressing the energy problems of developing countries. This objective is pursued through activities ranging from historical economic analyses of the role of energy in development to assessments of individual technologies carried out in support of research and development planning. The project, started in 1975, carries a particular emphasis on the energy problems and technologies appropriate to rural development. A firm tenet of the activity is, however, that the role of individual energy technologies can be understood only through an integrated view of the entire energy system and the way in which that system meshes with the economic and cultural structure of a society. The entire group of LDCs are being examined to develop a better understanding of the role of energy in development and to project the energy requirements of those countries under alternative growth patterns. Some representative countries were used as the basis for generic energy technology assessment. Seven countries were chosen as an initial set for analysis based on their representing a range of levels of development, climate, resource base, etc. These countries were India and Kenya (in the low, less than \$200 per capita, income group) Ghana and South Korea (in the intermediate income group), and Chile, Brazil and Greece (in the upper, greater than \$550 per capita, income group). In constructing energy supply-demand models for these countries, emphasis was placed on incorporating data on noncommercial energy use wherever such information was available. (ERA citation 02:013794)

**BNL-22311** PC A02/MF A01  
Brookhaven National Lab., Upton, N.Y.  
**Role of Renewable Energy Technologies in Developing Countries**  
P. F. Palmedo. 10 Jan 77, 11p  
Contract EY-76-C-02-0016

Descriptors: \*Developing countries, \*Energy source development, \*Technology utilization, Efficiency, Energy consumption, Energy sources, Financing, Global aspects, Planning, Recommendations, Research programs.  
Identifiers: ERDA/299000.

Some of the implications of the choice between renewable, decentralized technologies and non-renewable, centralized technologies as applied to developing countries are presented. The focus on developing countries does not imply that the choice is not a pertinent one for developed countries, but only that it is a particularly pressing one for the lesser-developed countries. In order to clarify the significance of the distinction between renewable and depletable resources, two qualifications are made. The resource and its feasible system to use that resource is of primary interest. Sunlight is free but the devices to use that resource may require a rare metal, which then makes the use of solar energy not renewable. The second qualification is that some resources that are finite such as deuterium as used in fusion reactors have such large abundance that they can be considered renewable. Some specific steps that can be taken to give renewable energy resources an opportunity to compete on a more equal footing with conventional fossil and nuclear technologies in the LDCs are: stimulate and support energy planning in developing countries; include appropriate technology in developed country R and D programs; and develop and demonstrate technologies in the LDCs. These activities would represent no financial burden to the developed world. A realistic appraisal of potential renewable resources to meet the future energy needs of developing countries is important. (ERA citation 02:039519)

**BNL-23340** PC A03/MF A01  
State Univ. of New York at Stony Brook.  
**Energy Planning and Management in Developing Countries: Thoughts Concerning a Conceptual Framework**  
R. Nathans, and P. F. Palmedo. 11 Oct 77, 39  
Contract EY-76-C-02-0016

Descriptors: \*Developing countries, \*Energy management, \*Energy models, Data acquisition, Government policies, International cooperation, Planning, Social impact, Sociology, Urban areas.



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Identifiers: ERDA/290000, ERDA/290100, ERDA/290200.

The unique characteristics of the energy situation in developing countries imposes a unique set of requirements on analytical techniques used for energy planning. The urgency of the situation requires the rapid development and use of simplified models which make maximum use of available data but which can reflect the international energy context. Those techniques must also be able to deal with central energy/development issues such as energy equity or the energy implication of social equity policies, centralized vs. decentralized development, and urbanization. (ERA citation 03:024139)

**BNL-50633** PC A07/MF A01  
Brookhaven National Lab., Upton, N.Y.

**Planner's Energy Workbook: A Manual for Exploring Relationships Between Land Use and Energy Utilization**

T. O. Carroll, R. Nathans, P. F. Palmedo, and R. Stern. Jun 77, 129  
Contract EY-76-C-02-0016

Descriptors: \*Energy analysis conservation, \*Energy supplies, \*Land use, \*Rural areas, \*Urban areas, Communities, Charges, Correlations, Demand factors, Energy consumption, Energy policy, Government policies, Manuals, Planning, Regional analysis, Social impact.  
Identifiers: ERDA/290000, ERDA/290300, ERDA/290100, ERDA/510500, ERDA/320100, \*Regional planning.

It has been clear that the magnitude and character of a region's energy requirements are intimately related to the spatial configuration and mix of land use activities. To the degree to which they can shape the future configurations of residential, commercial, industrial, and transportation activities, local governments and their planners must give serious consideration to the energy implications of those configurations in the light of future social goals and requirements. This Planner's Energy Workbook describes a set of procedures that can be used to carry out community and regional energy analyses. The choice of land use activity parameters and their relation to energy use characteristics are associated with the normal planning concepts of land use density, type of residential development, commercial floorspace, industrial sales and employment, and shopping and work trip lengths. At the same time these energy related intensity coefficients are expressed in a form that permits the analysis of short-term conservation strategies such as the retrofit of insulation and the introduction of new technologies such as solar energy. An integrating framework is provided to construct total community or area energy consumption profiles and future needs; to examine compatibility between area requirements and the energy supply-distribution system serving the area; and to evaluate the implications for energy use of the physical configuration of urban, suburban and rural areas. Two cases illustrate the application of this Workbook. The Long Island area is representative of major suburban regions throughout the U.S. which have undergone major growth and development. A community redevelopment design in Tuscon, Arizona is typical of rapid and major land use development within the environs of an existing city. (ERA citation 03:010551)

**COM-71-00049** PC A11 MF A01  
Bureau of Commercial Fisheries, Ann Arbor, Mich.  
**A Program of Research for the Catfish Farming Industry.**  
Sep 70, 233p\* EDACOMM-70-015

Descriptors: \*Fisheries, Economic development, \*Catfishes, \*Aquaculture, Surveys, Methodology, Feeding stuffs, Harvesting, Processing, Marketing, Food services, Ponds, Lakes, Equipment, Statistical data, Profits.  
Identifiers: \*Fish farms.

The study reports on the history and current state of the industry, improvement of harvesting methods and equipment, and present and future markets including pay-lakes and restaurants. Research results are reported as regards catfish

processing and feedstuffs and diets for catfish. (EDA ABSTRACT)

**COM-71-00111** PC A20 MF A01  
Checchi and Co., Washington, D.C.  
**The Role of Cooperatives in the Production and Marketing of Fruits and Vegetables in Puerto Rico.**  
Final rept.  
Aug 70, 474p EDA-70-020  
Grant EDA-02-6-09134

Descriptors: \*Marketing, Cooperation, \*Farm processing, Economic development, \*Economic development, \*Puerto Rico, \*Agricultural products, Marketing, Fruits, Vegetables, Financial management, Management engineering, Local government, Policies, Market research, Economic factors.  
Identifiers: Technical assistance projects, \*Agricultural cooperatives, \*Cooperatives, Cooperative production and marketing systems.

The report concludes that a new fruit and vegetable growing and marketing cooperative should be established as the basic element in an approach to self-sufficiency in fruit and vegetable production for Puerto Rico. The study says adequate financing and management and enthusiastic support from the Commonwealth government can produce an agricultural cooperative that will contribute significantly to community economy. Types of produce have been examined in terms of production and marketing. Organization of cooperatives is also discussed. (EDA abstract)

**COM-71-00202** Reprint  
National Marine Fisheries Service, Seattle, Wash. Biological Lab.  
**Growth in Experimental Populations of Tilapia mossambica**  
Ralph P. Silliman. 24 Jun 70, 3p NOAA-71011206  
Pub. in BioScience, v20 n20 p1109-1110, 15 Oct 70.

Descriptors: \*Fishes, Growth, \*Fresh water fishes, Growth, Fresh water biology, Growth curves, Gompertz curves, Aquatic biology, Food consumption, Population(Statistics).  
Identifiers: \*Tilapia mossambica.

Two populations of Tilapia mossambica were raised in tanks and their growth (weight and length) recorded for a period of 36 months. The relationship between number and weight is graphed, but was drastically disturbed by accidental mortalities at month 21.1. It never regained regularity after the accident; prior to that it had been regular. (Author)

**COM-71-00655** PC A02 MF A01  
National Marine Fisheries Service, Miami, Fla. Tropical Atlantic Biological Lab.  
**Commercial Fishery and Biology of the Fresh-Water Shrimp, 'Macrobrachium', in the Lower St. Paul River, Liberia, 1952-53**  
Special scientific rept.  
George C. Miller. Feb 71, 17p Fisheries-626, Contrib-141, NOAA-71032318

Descriptors: \*Shrimps, Fisheries, \*Fisheries, \*Liberia, Freshwater biology, Estuaries, Seasonal variations, Marine biology, Shellfish, Fecundity.  
Identifiers: Macrobrachium.

A small fishery was conducted for the large commercial fresh-water shrimp, Macrobrachium vollenhovenii, using traps. A second smaller species, M. macrobrachion, was culled from the trap catch for the fishermen's use. The estuarine fishery was seasonal (May to January), during the period of low salinity. Cost of raw tail meats to the consumer was over \$1.00 (U.S.) per pound. The fishermen derived more than \$7,500 from the fishery. Commercial shrimp, M. vollenhovenii, spawned in the estuary from May to January. Fecundity was estimated at 12,000 to 45,000 eggs per female. As the embryo developed the color of the egg changed from red to brown. Embryonic and larval development to time of setting of M. vollenhovenii was believed similar to that of M. rosenbergii 50 to 65 days. An intensive push-net fishery was conducted

on the zero age group soon after the juveniles had set. Juvenile shrimp were not caught by traps.

**COM-71-00716** PC A17 MF A01  
Black and Veatch, Kansas City, Mo.  
**Preliminary Study of the Development of Water Resources of the Humacao Sub-Region Puerto Rico**  
May 71, 388p EDA-71-060  
Prepared in cooperation with Domenech (R. A.) and Associates, Hato Rey, Puerto Rico.

Descriptors: \*Water supply, Surveys, \*Economic development, Puerto Rico, \*Puerto Rico, \*Water resources, Requirements, Recommendations, Surface water runoff, Groundwater, Demography, Econometrics, Water storage, Classifications, Soil erosion, Waste water, Flood control, Government policies.  
Identifiers: \*Humacao(Puerto Rico).

The report appraises present and future water needs and analyzes potential yield from sources of water supply. Surface water and ground water control problems are identified. Alternative recommendations are made on how to provide water for the area's change over from an agricultural to an industrial economy. These include use of ground water as an economical water source and surface water through reservoirs, wastewater reclamation, and long distance imports. Sea water as a source is reported as uneconomical. Other recommendations: floodways and levees rather than storage reservoirs for flood control. Wastewater disposal in the ocean with disposal in streams to be phased out. Data to be coordinated for guidance in design of water development projects, and strict regulation to be provided to avoid waste resulting from increasing competition for water supplies. Detailed maps and figures are included.

**COM-71-00717** PC A04 MF A01  
Indian Development District of Arizona, Inc., Phoenix.  
**Arizona Indian Business Development Program**  
Final rept.  
Robert J. Slinkard. 1971, 67p EDA-71-057  
Contract EDA-9-35142

Descriptors: \*Ethnic groups, American Indian languages, \*Economic development, Projects, \*Commerce, \*Arizona, Rural areas, Economic surveys, Regional planning, Community development, Industrial training, Counseling, Manuals.  
Identifiers: \*Minority owned enterprises, \*American Indians, Indian reservations, Technical assistance.

The report reviews 133 projects processed in efforts to further the growth of business on Indian reservations by Indian entrepreneurs. An untried approach, the promotion of Indians in business in relatively remote areas where business facilities have never been before and where a business atmosphere did not exist. An improvised training manual to suit such areas is reproduced in the report as are various forms used in carrying out the project. In addition to counseling, the project provided technical assistance services refinancing, promotion of community support for new businesses, management, production, and training, and legal needs. (EDA abstract)

**COM-71-01017** PC A05 MF A01  
National Marine Fisheries Service, Gloucester, Mass. Fishery Products Technology Lab.  
**A Study to Develop New Products from Whiting or Other Underutilized Species**  
Feasibility study Nov 68-Oct 70  
M. L. Anderson, and J. M. Mendelsohn. Aug 71, 79p EDA-71-090

Descriptors: \*Fishes, \*Food processing, Economic development, Abundance, Unemployment, Freeze drying, Market research, Cost estimates, Feasibility.  
Identifiers: Whiting, Salt curing, Fishcakes.

The study describes development of a rapid salt-curing process for whiting and similar species that are underutilized when they are most seasonally abundant. The process requires fish fillets to be



ground in saturated brine with salt added to keep the brine saturated during salting. It can be completed in less than a day. Reports indicate the product is a good ingredient for fishcakes and can be used to make convenience-type heat-and-serve foods. Limited marketing studies indicate good commercial potential for these products when a meat-bone separator is further developed. The report says whiting and related products must be produced on a semi-commercial scale before costs can be assessed, but that estimates indicate they can be competitive with other products now on the market. (Author)

**COM-71-50005-62**

PC-SOD/MF A01-NTIS

Bureau of International Commerce, Washington, D.C.

## **Establishing a Business in Turkey**

Overseas Business Reports

Peter B. Hale. Nov 70, 20p Rept no. OBR-70-62  
Supersedes OBR-67-77, COM-70-00854. Paper copy available from SOD \$16.00/year, \$0.15/copy as C1.50:70-62.

Descriptors: \*Economic development, \*Turkey, \*Investments, Handbooks, Capital, Government policies, Treaties, Legislation, Organizations, Patents, Copyrights, Employment, Taxes, Fees, Public utilities, Labor relations.

Identifiers: Overseas business reports, Business organizations, Capital repatriation, Trademarks.

Basic, authoritative information is presented for exporters, importers, investors, manufacturers, researchers, and those concerned with international trade and economic conditions. (BIC abstract)

**COM-71-50005-92**

PC-SOD/MF A01-NTIS

Bureau of International Commerce, Washington, D.C.

## **Establishing a Business in the Dominican Republic. 13p**

Overseas Business Reports

Robert H. Bateman. Dec 70, 13p Rept no. OBR-70-92  
Paper copy available from SOD \$16.00/year, \$0.15/copy as C1.50:70-92.

Descriptors: \*Economic development, \*Dominican Republic, \*Investments, Handbooks, Capital, Government policies, Industries, Sugar crops, Legislation, Land titles, Mining, Organizations, Patents, Employment, Taxes, Copyrights.

Identifiers: Overseas business reports, Business organizations, Sugar industry, Capital repatriation.

Basic, authoritative information is presented for exporters, importers, investors, manufacturers, researchers, and those concerned with international trade and economic conditions. (BIC abstract)

**COM-71-50584**

PC A02/MF A01

Rhode Island Univ., Kingston, International Center for Marine Resource Development.

## **The Potential for Fishery Development in the Caribbean and Adjacent Seas**

Clarence P. Idyll. 1971, 17p Marine Bull-1, NOAA-71102004

Presented at Rhode Island Univ. on Mar 16, 1971, at a seminar on issues of International Economic Development.

Descriptors: \*Fisheries, Economic development, \*Caribbean Sea, Fisheries, Developing countries, Food supply, Economic factors, Fishing, Seafood, Financing, Marketing, Manpower, Government policies.

The Caribbean Region is examined for its potential to produce greater supplies of food from the sea. The Caribbean people are relatively large consumers of fish and spend an important part of their scarce foreign exchange to buy fish from other nations. In considering the potential of fish and seafood from these enormous water areas it would appear that importing large supplies of seafood would be unnecessary. Factors to consider in fishery development in this area include the political, social and economic aspects, since these determine whether whatever fish is available can be

transported, marketed and purchased by the people of this area. (Author)

**COM-72-10048**

PC A02/MF A01

Kansas Agricultural Experiment Station, Manhattan.

## **Producing Channel Catfish**

Otto W. Tiemeier, and Charles W. Deyoe. May

67, 24p Bull-508, NOAA-72011312

Grant NMFS-4-1-R

Also pub. as Kansas State Univ., Manhattan. Dept. of Zoology Contrib-396 and Dept. of Grain Science and Industry Contrib-598.

Descriptors: \*Aquaculture, \*Catfishes, Ponds, Animal nutrition, Feeding stuffs, Animal diseases, Reproduction(Animal), Soils, Fertilizing.

Information on the production of channel catfish in ponds includes pond characteristics, dissolved oxygen, stocking, feeding, and suggested treatments for fish diseases. (Author)

**COM-72-10054**

PC A03/MF A01

Colorado Cooperative Fishery Univ, Fort Collins.

## **Pond Culture of Bait Fishes**

Stephen A. Flickinger. 1 Apr 71, 43p NOAA-72011322

Grant NMFS-6-2-D

Also pub. as Colorado Univ., Fort Collins. Cooperative Extension Service Bull-478A.

Descriptors: \*Aquaculture, \*Minnows, \*Economic surveys, Aquaculture, Marketing, Ponds, Construction, Fresh water biology, Fishing, Feeding(Supplying), Diseases, Reproduction(Biology), Parasites.

Identifiers: Bait fishes, \*Pond culture.

Major considerations in the culture of the golden shiner and fathead minnow as bait fish are presented. Emphasis is upon economic considerations, pond construction, propagation techniques, feeding and harvesting. (Author)

**COM-72-10055**

PC A02/MF A01

State Coll. of Arkansas, Conway.

## **Culturing Trout in Cages**

Completion rept. 2 Nov 70-30 Jun 71

Richard A. Collins. Sep 71, 14p NOAA-72011321

Grant NMFS-2-133-R

Prepared in cooperation with Arkansas Game and Fish Commission, Little Rock, Ark.

Descriptors: \*Aquaculture, \*Trout, Freshwater fishes, Diets, Growth curves, Water, Temperature, Fisheries.

Identifiers: \*Cage culture.

The major objectives of the study were to determine the feasibility of culturing rainbow trout in cages from fingerlings to edible size during the cooler months of the year in warmwater lakes, the proper stocking density in the cages, and the economic feasibility of culturing trout in cages. (Author)

**COM-72-10056**

PC A02/MF A01

State Coll. of Arkansas, Conway.

## **Development of the Cage Culture Method of Fish Production for Commercial Use in Large Reservoir Lakes**

Completion rept. 1 Mar 70-28 Feb 71

Richard A. Collins. Aug 71, 14p NOAA-72011320

Grant NMFS-4-67-D

Prepared in cooperation with Arkansas Game and Fish Commission, Little Rock, Ark.

Descriptors: \*Aquaculture, \*Catfishes, Freshwater fishes, Growth curves, Diets, Reservoirs, Fisheries.

Identifiers: Fish cages, \*Cage culture.

Four different cage designs ranging in volume from three to 12 cubic yards were each stocked with 300 fingerling catfish per cubic yard to determine the effects of the different cage sizes on growth and conversion of the fish. Fingerlings were graded to a uniform size before being stocked in an attempt to eliminate the differential growth. Results indicate that in large reservoir lakes the cage size can be unlimited in surface area and as deep

as the water containing adequate dissolved oxygen. The depth of the cages had no important bearing on the growth rate and in the cages with the greater surface area the catfish grew more rapidly and converted food better. It was concluded that differential growth of catfish in cages is a result of initial variance of the fingerling fish and not to hierarchy. Large numbers of wild fish around the cages caused problems of loss of food and possibly introduction of diseases. The wild fish can, however, be effectively trapped in the area of the cages. The economic evaluation indicates the following situations: a small scale operation incorporated into an existing business such as a marina and a very large scale operation (200,000 or more fish). (Author)

**COM-72-10588**

PC A06/MF A01

Bureau of Sport Fisheries and Wildlife, Stuttgart, Ark. Warmwater Fish Cultural Labs.

## **Factors Affecting the Growth and Production of Channel Catfish in Raceways**

Jun 72, 108p EDA-72-036

Descriptors: \*Fishes, \*Aquaculture, Economic development, Nutrition, Growth, Waste treatment, Organic wastes.

Identifiers: \*Catfish, *Ictalurus catus*.

The study shows that fish can be reared successfully in tanks, but that production costs under the present system would eliminate all profit. Data are presented to indicate that further studies would be useful. It is stated that recycling of effluent waters can reduce levels of metabolic wastes sufficiently to support fish growth. The report includes evaluations of filters and of an oxidation pool to remove wastes, stocking density and diet studies, and reports on examinations of plasma proteins, tissue composition, and the liver of channel catfish.

**COM-72-10654**

Reprint

National Marine Fisheries Service, Auke Bay, Alaska. Auke Bay Fisheries Lab.

## **An Easy to Make Large-Capacity Flowmeter**

Frederick H. Salter. 1972, 3p NOAA-72051631

Pub. in The Progressive Fish-Culturist, v34 n2 p116-117, Apr 72.

Descriptors: \*Flowmeters, Design, Fisheries, Aquaculture, Manuals, Fabrication, Polymethyl methacrylate, Tubes.

Detailed instructions for building a nontoxic, nine gallon per minute device are presented.

**COM-72-11160**

PC A05/MF A01

Georgia Game and Fish Commission, Atlanta.

## **A Study of the Nutritional, Physiological and Economical Requirements for the Production of Channel Catfish in an Intensive Running Water Culture**

Completion rept. 1 Apr 69-31 Apr 72

James W. Andrews. 20 Jun 72, 82p NOAA-72091969

Grant NMFS-2-84-R

Descriptors: \*Catfishes, Aquaculture, Animal nutrition, Feeding stuffs, Growth, Metabolism, Amino acids, Calcium, Phosphorus, Temperature, Dissolved oxygen, Photoperiodicity.

Identifiers: *Ictalurus punctatus*.

Fourteen studies were conducted on the nutritional and physiological requirements for the high density culture of channel catfish. Results from the initial experiments on stocking rate-water exchange requirements indicated that the possibility of commercial culture of catfish at high densities (up to 8 pounds per cu. ft. of water) in tanks or raceways has great potential. Additional environment requirement studies were conducted on the effects of temperature, photoperiod, dissolved oxygen levels and frequency of feeding on growth, food conversion and body composition. (Author)

**COM-72-11191**

Reprint

Lamont-Doherty Geological Observatory, Palisades, N.Y.

## **Fish Protein: Its Past, Present and Future**

Oswald A. Roels. 1972, 3p LDGO-1503, NOAA-72062721



Grant NSF-GH-16  
Pub. in Nautilus, v11 p10-11 1972.

Descriptors: \*Fish protein concentrates, \*Nutrition, Human nutrition, Food habits, Diets, Food processing, Fisheries, Nutritional deficiency diseases, Vitamin deficiency diseases, Proteins, Kwashiorkor.

Protein is in short supply in the world, as the incidence of kwashiorkor in many areas shows. The vast quantity of protein available in fish is, however, often wasted as far as human nutrition is concerned because it is not fed directly to humans. (Author)

## COM-72-11408-18 (Order as COM-72-11408)

Foods Multinational, Inc., Groton, Mass.  
**The Design of an Aquaculture Enterprise**  
Harold H. Webber. Nov 71, 10p NOAA-72092601-18  
Included in Gulf and Caribbean Fisheries Inst. Annual Session (24th), Miami, Fla., Nov 71. Proceedings May 72, p117-125, COM-72-11408.

Descriptors: \*Aquaculture, Economic analysis, Fishes, Fisheries, Management methods.

Existing methods of growing fish in high density cultures are described, and a check list of site selection criteria is given. (Author)

## COM-72-11539 PC A04/MF A01

Gibbs and Hill, Inc., New York.  
**Feasibility Study of Waste Water Recovery in Shrimp Processing Plants**  
Nov 72, 63p EDA-72-058

Descriptors: \*Shrimps, Food processing, \*Waste water, Recovery, Economic development, Employment, Regional planning, Feasibility, Water reclamation, Massachusetts, Fishing, Food industry, Cost analysis.  
Identifiers: Gloucester(Massachusetts).

The shrimp industry is capable of revitalizing the economy in Gloucester, Massachusetts, where fishing and fish processing employment has been waning. The study examines the need to provide waste water recovery facilities and peeling machinery modifications, so that the shrimp industry can develop new processing plants at Gloucester. Cost and technical processing data is included in the study, together with a schematic diagram indicating suggested facilities and modifications. (Author)

## COM-72-50175-017

PC-GPO/MF A01-NTIS/copy  
Bureau of International Commerce, Washington, D.C.  
**Establishing a Business in the Philippines**  
John D. Phipps. May 72, 20p Rept no. OBR-72-017  
Paper copy available from GPO \$16.00/year as C1.50:70, \$0.15/copy.

Descriptors: \*Economic development, \*Philippines, \*Investments, Handbooks, Legislation.  
Identifiers: Business organizations.

The reports present basic authoritative information for exporters, importers, investors, manufacturers, researchers, and those concerned with international trade and economic conditions. For individual reports, see below:

## COM-72-50175-018

PC-GPO/MF A01-NTIS  
Bureau of International Commerce, Washington, D.C.  
**Establishing a Business in Hong Kong**  
Arthur R. Dornheim. Jun 72, 28p Rept no. OBR-72-018  
Paper copy available from GPO \$16.00/year as C1.50:72, \$0.15/copy.

Descriptors: \*Economic development, \*Hong Kong, \*Investments, Handbooks, Economic conditions.  
Identifiers: Overseas Business Reports, \*Business organizations.

The reports present basic authoritative information for exporters, importers, investors, manufacturers, researchers, and those concerned with international trade and economic conditions. For individual reports, see below:

## COM-72-50175-027

PC-GPO/MF A01-NTIS  
Bureau of International Commerce, Washington, D.C.  
**Establishing a Business in Mexico**  
Paul S. Flores. Jul 72, 28p Rept no. OBR-72-027  
Paper copy available from GPO \$16.00/year as C1.50:72, \$0.15/copy.

Descriptors: \*Economic development, \*Mexico, \*Investments, Handbooks, Economic conditions.  
Identifiers: Overseas Business Reports, \*Business organizations.

The reports present basic authoritative information for exporters, importers, investors, manufacturers, researchers, and those concerned with international trade and economic conditions. For individual reports, see below:

## COM-72-50175-033

PC-GPO/MF A01-NTIS  
Bureau of International Commerce, Washington, D.C.  
**Establishing a Business in Kuwait**  
Kathleen M. Keim. Jul 72, 16p Rept no. OBR-72-033  
Paper copy available from GPO \$16.00/year as C1.50:72, \$0.15/copy.

Descriptors: \*Economic development, \*Kuwait, \*Investments, Handbooks.  
Identifiers: Overseas Business Reports, Business organizations.

The reports present basic authoritative information for exporters, importers, investors, manufacturers, researchers, and those concerned with international trade and economic conditions. For individual reports, see below:

## COM-72-50175-038

PC-GPO/MF A01-NTIS  
Bureau of International Commerce, Washington, D.C.  
**Establishing a Business in Thailand**  
John N. Randolph, Jr. Aug 72, 24 Rept no. OBR-72-038  
Paper copy available from GPO \$16.00/year as C1.50:72, \$0.15/copy.

Descriptors: \*Economic development, \*Thailand, \*Investments, Handbooks.  
Identifiers: Overseas Business Reports, Business organizations.

The reports present basic authoritative information for exporters, importers, investors, manufacturers, researchers, and those concerned with international trade and economic conditions. For individual reports, see below:

## COM-72-50251-03-12

(Order as COM-72-50251-03)  
National Marine Fisheries Service, Seattle, Wash.  
Northwest Fisheries Center.  
**Effect of Crowding on Relation Between Exploitation and Yield in 'Tilapia macrocephala'**  
Ralph P. Silliman. Nov 71, 8p NOAA-72101809-12  
Included in Fishery Bull., v70 n3 p693-698 Jul 72.

Descriptors: \*Fishes, Population(Statistics), \*Aquaculture, Population(Statistics), Growth, Environments, Marine fishes, Marine biology, Periodicals.  
Identifiers: Tilapia macrocephala.

An experiment was performed to assess the effect of crowding on yield in Tilapia macrocephala. Populations of nearly equal number and weight were started in control (155.2 liter) and test (77.6 liter) tanks. Food amounts and environmental attributes other than space were the same for both tanks. Each of the two populations was exploited - first at a bimonthly rate of 10% for 14 months, then at a

bimonthly rate of 25% for 10 months. Equilibrium yields at each rate for each tank (four points) were fitted with a Fox exponential surplus-yield model. Deviations from this general population curve showed that yields were greater for the larger tank at the 25% rate and greater for the smaller tank at the 10% rate. This is believed to result from the fact that the entire yield came from growth at the lower rate whereas part of the yield came from recruitment at the higher rate. A low rate of conversion of food to fish (18%) is believed to be due to the large proportion of liver in the diet. (Author)

## COM-72-50659

PC-GPO/MF A01-NTIS  
Economic Development Administration, Washington, D.C.  
**Urban Business Profile: Supermarkets**  
Apr 72, 34p Rept no. EDA-72-59597  
Prepared in cooperation with Office of Minority Business Enterprise, Washington, D.C.  
Paper copy available from GPO \$0.30 as C46.27:SU7.

Descriptors: \*Marketing, Urban areas, \*Commerce, Manuals, Risk, Feasibility, Organizing, Management, Leasing, Financing, Inventories, Competition.  
Identifiers: Urban business profiles, \*Minority enterprises, Technical assistance, Cooperatives, \*Supermarkets.

The report is designed to provide a potential businessman with a better understanding of the opportunities, requirements, and problems associated with operating a supermarket, to provide guidelines on types of information required for location-specific feasibility studies; and to assist urban development groups in their business creation activities.

## COM-73-10115-04

(Order as COM-73-10115)  
Hawaii Univ., Honolulu.  
**Some Remarks on Aquaculture**  
John Bardach. 1971, 7p NOAA-72102701-4  
Included in Proceedings: National Sea Grant Conference (4th), Oct 71, p83-88, COM-73-10115.

Descriptors: \*Aquaculture, Economic development, Fishes, Economic factors, Feeding stuffs, Animal nutrition, Human nutrition.  
Identifiers: Sea Grant program.

An appraisal of the influences on and constraints to the development of aquaculture should be approached through systems models where initial, crude modeling leads to the definition of specific research needs. As such research is undertaken, its results are fed back into more refined models, hopefully soon to answer the overall question: what is the true potential of aquaculture and how can it be attained. (Author)

## COM-73-10152

PC A04/MF A01  
Massachusetts Inst. of Tech., Cambridge. Sea Grant Project Office.  
**A Preliminary Feasibility Study of Irish Moss Harvesting Systems**  
James M. Patell. 30 Jun 72, 74p MITSG-72-14, NOAA-72121102  
Contract NOAA-2-35150  
Sponsored in part by Henry L. and Grace Doherty Charitable Foundation, Inc., Darien, Conn.

Descriptors: \*Aquatic plants, Harvesting, Algae, Rhodophyta, Evaluation, Feasibility, Machinery, Massachusetts, New Hampshire, Economic development, Maine, Coasts.  
Identifiers: Sea Grant program, Chondrus crispus, Gigartina stellata.

The feasibility of developing mechanized harvesting systems is discussed. Biological, economic, environmental, and legal constraints on the system design are delineated. The operation of two systems which have been constructed and tested is described. It is concluded that while the technology to construct the system exists, such a system would be economically unfeasible due to the low unit price of harvested Irish Moss. An improved manual harvester is also described. (Author)



**COM-73-10275** PC A02/MF A01  
Rhode Island Univ., Kingston. Marine Advisory Service.  
**Fisheries Cooperatives: Their Formation and Operation**  
James J. Napoli. Oct 72, 21p Marine M-30, NOAA-73012403

Descriptors: \*Fisheries, Production, \*Marketing, Cooperation, Organizations, Law(Jurisprudence), Harvesting, Credit, Management, Banking business.  
Identifiers: \*Cooperatives.

The organization, development, function, and problems of producer cooperatives for fishermen are discussed. An appendix covers the Farm Credit System: its organization, authority, and eligibility requirements to borrow. (Author)

**COM-73-10333** PC A03/MF A01  
California State Univ., Humboldt, Arcata. Marine Advisory Extension Service.  
**A Pilot Fish-Pond System for Utilization of Sewage Effluents, Humboldt Bay, Northern California**  
George Allen, Guy Conversano, and Bryan Colwell. Sep 72, 31p CSUH-SG-3, NOAA-73020201  
Errata sheet inserted.

Descriptors: \*Aquaculture, \*Sewage disposal, \*Lagoons(Ponds), Aquaculture, Utilization, Cost estimates, Site surveys, Construction costs, Construction materials.  
Identifiers: Aeration ponds, Arcata(California).

The paper documents all out-of-pocket and other real costs in the construction of a pilot fish pond system for the utilization of sewage effluents, Humboldt Bay, Northern California. Discussions deal with the engineering and construction problems encountered. A description of the project site and reasons for site selection are explained.

**COM-73-10343** PC A03/MF A01  
Lake States Forestry Cooperative, Inc., Duluth, Minn.  
**Forestry Cooperative Demonstration Program**  
Interim rept. Feb 70-Nov 72.  
Mar 73, 47p EDA-73-020

Descriptors: \*Economic development, Forestry, \*Forestry, Great Lakes Region, Management planning, Land use, Marketing, Rural areas, Forest land, Employment, Organizations.  
Identifiers: Technical assistance, Cooperatives.

The report describes a forestry cooperative demonstration project funded by EDA and the Upper Great Lakes Regional Commission to evaluate potential for forestry cooperatives in the Great Lake States. A 6-months feasibility study shows need for an organization to work with private woodland owners on management practices. Also described is a business development program, which assisted existing businesses, helped create new business, and provided management and marketing assistance. The potential for a statewide landowners' association is explored. A section of the report is devoted to implications for rural development activities, with emphasis on cooperatives. (Author)

**COM-73-10355** PC A02/MF A01  
Utah State Board for Vocational Education, Salt Lake City.  
**Plute Vocational Education Project--Plute County School District**  
Final rept.  
Oct 72, 20p FCRC-TA-411-112-035

Descriptors: \*Education, \*Farms, \*Vocational guidance, \*New Mexico, Economic development, Projects, Specialized training, Community development, Surveys, Livestock, Water supply, Dairies, Poultry, Swine, Land development, Mining.  
Identifiers: \*Plute County(New Mexico), Tourism.

A report is made on planning and implementation of farm program curricula and demonstration projects.

**COM-73-10527** PC A03/MF A01  
New Mexico Univ., Albuquerque. Center of Environmental Research and Development.  
**A Study of the Feasibility of Mechanized Adobe Production**  
Aug 70, 49p FCRC-TA-301-500-013

Descriptors: \*Bricks, Mass production, \*Houses, \*Brick construction, Brick structures, Structural clay products, Brick industry, Materials handling, Production methods, Feasibility, Cost analysis, Building codes.  
Identifiers: \*Adobe, Adobe construction, FCRC.

The general purpose of this study is to determine the economic feasibility of the Centro de Adobes concept, considered an Economic Opportunity Development for the poor. The project designers see the creation of from 15 to 30 new jobs per manufacturing center. It is also necessary to predict the subsidiary job creation as well as to estimate what this may mean in terms of dollar turnover in the total economy of a typical village (and in general terms, of the state). (Author)

**COM-73-10771** PC A05/MF A01  
Miami Univ., Fla. Sea Grant Institutional Program.  
**The Commercial Feasibility of Rearing Pompano, 'Trachinotus carolinus' (Linnaeus), in Cages**  
Theodore Isaac Jogues Smith. Jan 73, 80p Sea Grant Technical Bull-26, NOAA-73050817  
Contract NOAA-2-35147

Descriptors: \*Fishes, \*Aquaculture, Growth, Mortality, Diseases, Economics, Florida.  
Identifiers: Sea Grant program, \*Trachinotus carolinus, NOAA.

The University of Miami has been actively involved in developing pompano farming as a viable industry, both through its research programs and its consultations with companies involved with pompano-rearing. Objectives of this project were to assess the suitability of cages for raising pompano and to measure growth and mortality at stocking densities that would be likely in a commercial operation. This paper presents the results of the above investigation and, on the basis of data collected and observations made, discusses the problems and future of pompano farming as a potential industry.

**COM-73-10790** PC A02/MF A01  
Oregon State Univ., Corvallis. Sea Grant Marine Advisory Program.  
**Organizing and Operating a Fishery Cooperative. Part One**  
Frederick J. Smith. 1973, 5p OSU-SG-19, NOAA-73050201  
See also Part 2, COM-73-10791.

Descriptors: \*Fisheries, Management, Organizing, Industries, Law(Jurisprudence), Operations.  
Identifiers: Sea Grant program, \*Fishery cooperatives, NOAA.

The publication provides information about cooperative organization, management, and legal instruments used in organizing and operating a cooperative. It is available in two parts. This portion, part one, provides an overview of cooperative organization and operation. Part two provides greater detail about the legal instruments and requirements of a fishery cooperative.

**COM-73-10791** PC E01/MF A01  
Oregon State Univ., Corvallis. Sea Grant Marine Advisory Program.  
**Organizing and Operating a Fishery Cooperative. Part II**  
Frederick J. Smith. 1973, 45 OSU-SG-19a, NOAA-73050202  
See also Part 1, COM-73-10790.

Descriptors: \*Fisheries, Organizations, Law(Jurisprudence), Management, Industries, Marketing, Regulations.  
Identifiers: Sea Grant program, NOAA.

The publication provides information about cooperative organization, management, and legal instruments used in organizing and operating a co-

operative. It is available in two parts. The first part provides an overview of cooperative organization and operation. This portion, part two, provides greater detail about the legal instruments and requirements of a fishery cooperative.

**COM-73-10795** PC A05/MF A01  
Puerto Rico Dept. of Agriculture, Mayaguez. Lab. of Commercial Fisheries.  
**A Study of the Feasibility of Establishing a Distant-Water Fishing Industry in Puerto Rico**  
Feasibility study.  
May 73, 79p EDA-73-032  
Contract C-0-35464

Descriptors: \*Fisheries, Feasibility, \*Economic development, \*Puerto Rico, Aquaculture, Employment, Unemployment, Financing, Bibliographies, Regional planning.  
Identifiers: Technical assistance, EDA.

The report reviews possibilities for a distant-water fishing industry in Puerto Rico and concludes that fishing, processing, and shore support can all be developed for profit but not without risk. It is suggested that a Puerto Rican fleet could harvest a substantial amount of fish in the Caribbean and the tropical Atlantic. Alternatives of how best to do this are presented. The report also reviews potential for developing Puerto Rican-based processing facilities and shore support services. A bibliography is appended.

**COM-73-10810** PC A02/MF A01  
Illinois State Natural History Survey, Urbana. Aquatic Biology Section.  
**Combined Culture of Channel Catfish and Golden Shiners in Wading Pools**  
D. Homer Buck, Richard J. Baur, Charles F. III Thoits, and C. Russell Rose. Apr 72, 13p  
Biological Notes-79, NOAA-73050404  
Grant NMFS-4-36-R

Descriptors: \*Fishes, \*Aquaculture, Catfishes, Carp, Minnows, Shiners, Mixing, Growth, Ecology.  
Identifiers: Ictalurus punctatus, Notemigonus crysoleucas, Tilapia mossambica, Cyprinus carpio, Tilapia aurea, Animal behavior, NOAA.

The study was undertaken to obtain information on the behavior, comparative efficiencies, and degrees of compatibility of channel catfish and golden shiners when in different combinations and under different spatial limitations. It was found that growth increments of carp (Cyprinus carpio) and tilapia (Tilapia aurea) in mixed culture sometimes exceeded those exhibited by either in monoculture. The authors found that the channel catfish, golden shiner and tilapia (T. mossambica) were extremely compatible. When combined, each stimulated the other to a faster and stronger feeding response, which resulted in a more efficient conversion of food.

**COM-73-50276** PC-GPO/MF A01-NTIS  
National Marine Fisheries Service, Seattle, Wash.  
**A Review of the Literature on the Development of Skipjack Tuna Fisheries in the Central and Western Pacific Ocean**  
Technical rept.  
Frank J. Hester, and Tamio Otsu. Jan 73, 20p  
NOAA-TR-NMFS-SSRF-661, NOAA-7030518  
Paper copy available from GPO \$0.25 as C55.13.NMFS-SSRF-661.

Descriptors: \*Tunas, Fisheries, \*Fisheries, \*Pacific Ocean, Reviews, Management, Abundance, Economic development, Assessments.  
Identifiers: Katsuwonus pelamis, Bait fish, \*Skipjack tuna, Central Pacific Ocean, Western Pacific Ocean, NOAA.

There has been a rapid acceleration in efforts to develop skipjack tuna fisheries in the central and western Pacific. This is because the resources of the larger tunas (yellowfin, bigeye, bluefin, and albacore) are already being fished at or near the maximum sustainable level. The greatest potential for increased harvest appears to be the skipjack resource. To assist the skipjack development effort, pertinent information on the subject is summarized and a bibliography of selected references is included. (Author)



## COM-73-50645-11-2

(Order as COM-73-50645-11)

National Marine Fisheries Service, Seattle, Wash. Pacific Fishery Products Technology Center.  
**The Technological Basis for Development of Aquaculture to Produce Low-Cost Food Fish**  
J. A. Dassow, and M. A. Steinberg. 1973, 9p  
MFR-Paper-1015, NOAA-73112804-2  
Included in Marine Fisheries Review, v35 n11 p6-13 Nov 73, COM-73-50645-11.

Descriptors: \*Fishes, \*Aquaculture, Food processing, Quality, Cost factors, Frozen foods, Proteins, Inland waterways, Food additives.  
Identifiers: NOAA.

The technological basis for development of large-scale production of inland water fish, such as carp, buffalo fish, tilapia, and white amur, is reviewed. It is proposed that modern methods of mass production and fish culture be evaluated and combined to make the production of low-cost food fish feasible and economically attractive. The fish would be processed for maximum recovery of edible flesh by mechanical methods of flesh separation. The minced flesh would be modified and stabilized as required to prepare high-quality frozen fish blocks. These blocks would be suitable for a wide variety of frozen fishery products and convenience foods and could be used as protein additives in other foods such as processed meats. (Modified author abstract)

## COM-74-10007/4

PC A03/MF A01

Miami Univ., Fla. Sea Grant Institutional Program.  
**Guide to the Lobsters and Lobster-Like Animals of Florida, the Gulf of Mexico and the Caribbean Region**  
Lee Opreko, Dennis Opreko, Ronald Thomas, Gilbert Voss, and Frederick M. Bayer. Aug 73, 49p Sea Grant Field Guide Ser-1, NOAA-73112311  
Grant NOAA-043-158-27

Descriptors: \*Lobsters, \*Shellfish, \*Fisheries, Identifying, Manuals, Florida, Mexico Gulf, Caribbean Sea, Distribution(Property).  
Identifiers: Sea Grant program, NOAA.

The manual is intended to provide the non-specialist with the means of identifying in the field, both the shallow-water and deep-water lobsters which either are already fished commercially or might be fished if sufficient stocks could be discovered through exploratory trawling. To accomplish this end, a key is given together with explanatory illustrations of the important features used for identification. Preference has been given to conspicuous external characters such as shape, coloring, and sculptural features. The known geographical distribution of the various species is included in the descriptions, along with known depth ranges. Insofar as known, growth rates, spawning times, temperature and bottom conditions, and other pertinent data are given.

## COM-74-10059/5

Reprint

National Marine Fisheries Service, Seattle, Wash. Northwest Fisheries Center.  
**Examples of National Contributions to the Development and Management of the Oceans' Living Resources**  
Dayton L. Alverson. 1973, 20p NOAA-73121206  
Pub. in Proceedings of Annual Conference Marine Technology Society (9th), p191-208 1973.

Descriptors: \*Fisheries, \*Pacific Ocean, Resources, Seafood, Management, Economic development, Marine fishes, Lipids.  
Identifiers: Anadromous fishes, NOAA.

During this post-war era, the science of fisheries population dynamics grew to maturity through the establishment of workable quantitative theory. The era was also extremely productive in terms of scientific planning documents related to national ocean policy. A focal study of national investigations conducted in the northeastern Pacific suggests that such investigations have been instrumental in stimulating growth of the ocean food fish industry and provided information upon which major national and international management decisions have been made. In addition, such studies

have yielded information of value in maintenance of a productive aquatic environment.

## COM-74-10173/4

PC A04/MF A01

Oregon State Univ., Corvallis.  
**Preparation of Fish Protein Hydrolysates**  
Completion rept. Jul 70-Jun 73  
David L. Crawford. Jul 73, 55p NOAA-73122104  
Grant NMFS-1-69-R

Descriptors: \*Fish protein concentrates, \*Digestion(Decomposition), Hydrolases, Fishes, Preparation, Hydrolysis, Food processing, Food storage, Solvent extraction.  
Identifiers: Hake, Merluccius productus, NOAA.

An innovative procedure for developing and building a laboratory digestion unit capable of handling and producing approximately 10 liters of fish protein hydrolysate (FPH) is described. The unit consists of a pump, heat exchanger, and holding vat. Comminuted fish is pumped from the holding vat through the heat exchange system and recycled back into the holding vat until the comminuted fish reaches 140F. It is held at this temperature for one half hour at which point the comminuted fish, if capable of autolysis, will have shown a marked decrease in viscosity. The digestion process frees the fish bones from its fleshy matrix and may be easily separated at this point by sieving or centrifugation. The development of the laboratory digester provided a tool with which to determine the autolytic capabilities of other fish and fish scrap species. A detailed mineral analyses of bones prepared from seven species of autolyzed fish was conducted as well as preliminary examination on the general chemical and biological parameters of this autolyzed FPH.

## COM-74-10364/9

PC A03/MF A01

Georgia Marine Science Center, Savannah.  
**A Manual of Flatfish Rearing**  
Technical rept.  
David B. White, and Robert R. Stickney. Sep 73, 42p\* TR-73-7, NOAA-74011408  
Contract NOAA-1-36009

Descriptors: \*Flatfishes, \*Aquaculture, Animal nutrition, Diets, Larvae, Animal diseases, Documentation, Manuals.  
Identifiers: Sea Grant program, Paralichthys, Paralichthys lethostigma, Ancylopsetta quadrocellata, NOAA.

Basic culture techniques for rearing flatfishes are presented with consideration of supplies of eggs for culture, larval food and disease control, collection and care of postlarvae and juveniles, nutrition of postlarvae and juveniles, and environmental conditions for Paralichthys culture. Recommendation on site selection and construction of a physical plant are included. Three species of flatfish - Paralichthys dentatus, P. lethostigma, and Ancylopsetta quadrocellata are involved. This paper is intended as an introductory presentation to the layman who desires to work with one or more phases of the life cycle of the flatfish, and should serve as an introduction to the literature and culture techniques for interested scientists. Thirty-seven references are cited.

## COM-74-10394/6

PC E02/MF A01

National Bureau of Standards, Washington, D.C. Office of Engineering and Information Processing Standards.  
**National Program of Metrology for Ecuador**  
Final rept.  
Thomas M. Stabler. Apr 73, 33p Rept no. NBSIR-73-157

Descriptors: \*Metrology, \*Ecuador, \*Project planning, Foreign aid, Developing countries, Standardization, Education, Units of measurement, Recommendations, Classifications.  
Identifiers: NBS.

At the request of the Ecuadorian Institute of Standardization (INEN) the U.S. AID made arrangements for a weights and measures advisor to assist in the development of a program for scientific and legal metrology, including the design of a metrology laboratory, inspection system, a training program, and other essential features. A four week

survey by an NBS representative has resulted in recommendations for a metrology laboratory, physical standards, an Ecuadorian weights and measures law, regulations, and a control program.

## COM-74-10498/5

Reprint

Alabama Dept. of Conservation and Natural Resources, Montgomery. Marine Resources Div.  
**Brackish Water Cage Culture of Rainbow Trout (Salmo gairdneri), in South Alabama**  
Walter M. Tatum. 1973, 5p NOAA-74020106  
Grant NMFS-2-86-R  
Pub. in Transactions of the American Fisheries Society, v102 n4 p826-828 Oct 73.

Descriptors: \*Trout, \*Brackish water, \*Aquaculture, Alabama, Commercial fishing, Acclimatization, Feasibility, Fish economics, Fish stocking.  
Identifiers: \*Salmo gairdneri, NOAA.

Experiments in the brackish water culture of rainbow trout (Salmo gairdneri) were conducted from 25 November 1971 to 24 March 1972 to determine the feasibility of providing a supplemental cash crop in the coastal water of Alabama during the winter. During this period trout were raised from an initial weight of 93.8 g to 354.8 g when stocked at 196 fish/cu m and 322.3 g when stocked at 392 fish/cu m. Rainbow trout acclimated easily to brackish water and their potential to southern mariculture appears promising. (Author)

## COM-74-10543/8

PC E02/MF A01

Wisconsin Univ., Madison. Center of Applied Sociology.  
**Problems and Challenges Faced by Rural Communities with Industrial Development**  
John T. Scott, Jr, and Gene F. Summers. 1972, 25p EDA/OER-74-182  
Grant EDA-OER-417-G-72-7  
Prepared in cooperation with Illinois Univ., Urbana. Presented at North Central Regional Conference on Problems and Potentials of Rural Industrialization at Purdue, Univ., Lafayette, Ind., 11-13 Jul 72.

Descriptors: \*Rural areas, \*Industrialization, \*Problem solving, \*Economic development, Community relations, Economic impact, Illinois, Manufacturing, Industrial plants, Industrial development, Social effect, Labor force, Economic changes, Land use, Cost of living.  
Identifiers: Challenges, EDA.

The paper reviews a few typical problem areas which may arise in a rural community during and following industrialization. Data from a longitudinal (1966-1971) study of the construction of a large manufacturing facility in north central Illinois is used. Included in the discussion are such factors as the social and economic effects of the labor force employed by the industry, changes in the use of land and local facilities, and potential increases in the cost of living.

## COM-74-10547/9

PC A02/MF A01

Wisconsin Univ., Madison. Center of Applied Sociology.  
**Profile Change When Industry Moves Into a Rural Area**  
Working paper  
John T. Scott, Jr, Gene F. Summers, and John P. Clark. Feb 73, 15p\* EDA/OER-74-103  
Grant EDA-OER-417-G-72-7  
Prepared in cooperation with Illinois Univ., Urbana. Dept. of Sociology.

Descriptors: \*Rural areas, \*Industrialization, \*Economic impact, \*Economic development, Economic analysis, Economic characteristics, Resources, Social effect, Industrial plants, Illinois, Community relations, Manufacturing industries, Land use, Services, Manpower utilization, Retail sales, Housing characteristics.  
Identifiers: EDA.

The paper examines what happens to the economic and social profile of a rural community when industry is introduced. The profile delineates the type, amount, and ratio of existing resources and products of the community. Data from a longitudinal (1966-1971) study of the construction of a large manufacturing facility in north central Illinois is employed. The evidence suggests that the most



profound impact is on the land use and support systems. Additional changes are realized in the size and composition of the labor force, retail sales and services, housing development, and the demand for schools and other publicly provided services.

**COM-74-10722/8** PC E09/MF A01  
National Bureau of Standards, Washington, D.C.  
**Research Study on the Socio-Economic Aspects of Low-Cost Housing in the Philippines**  
Final rept.  
May 72, 250p Rept no. NBS-GCR-73-21  
Prepared in Sycip, Goores, Velayo and Co., Manila, Philippines. Sponsored in part by Agency for International Development, Washington, D.C.

Descriptors: \*Housing studies, \*Philippines, Typhoons, Damage, Demographic surveys, Economic surveys, Low cost housing, Community facilities, Housing starts, Climate influence, Household composition, Construction practices, Building codes, Socioeconomic conditions.  
Identifiers: NBS.

The report presents a survey of the historical occurrence of damages by typhoons, selected comparative indices for climate and housing construction, and an economic profile of the Philippines, as well as a regional demographic profile. A discussion is also presented on size and density of household dwelling units, trends in housing space expansion, community and municipal facilities; household income and household expenditures; financing sources for housing construction; availability and prices of construction materials and of labor; the capabilities of the housing industries; public reaction to new designs and materials; methods of housing construction; and building codes.

**COM-74-10910/9** PC A02/MF A01  
Tennessee Game and Fish Commission, Nashville.  
**Production of Channel Catfish in Cages**  
Completion rept. Mar 71-Feb 73  
Harold Hurst. Sep 73, 20p NOAA-74022630  
Grant NMFS-2-144-R

Descriptors: \*Catfishes, \*Feeding habits, Aquaculture, Cost comparison, Feeding stuffs, Tennessee.  
Identifiers: NOAA.

During 1971 and 1972, channel catfish fingerlings were stocked in cages at Maples Creek Lake, a 90-acre public fishing lake located in Carroll County, TN, to study some techniques involved in the production of channel catfish in cages. The fish were fed from July 30, 1971 until May 29, 1972 at which time they were harvested. The maximum production achieved in any cage was 575 lb/cu M. There was no significant difference in net gain or feed conversion due to the different stocking rates, which indicated crowding was not a factor in any of the cages. An analysis of production data indicated there was no significant difference in net gain or feed conversion due to feeding method. (Modified author abstract)

**COM-74-11005/7** PC A05/MF A01  
Marine Technology Society, Washington, D.C. Committee on Economic Potential of the Ocean.  
**Assessing Technology for Marine Resource Development. Proceedings of a Conference-Workshop Held by the Marine Technology Society at Arlington, Virginia on May 15-17, 1972**  
Milton G. Johnson. Mar 74, 97p\* NOAA-74032701

Descriptors: \*Marine engineering, \*Ocean environments, \*Meetings, Forecasting, Economic development, Oceanography, Investments, Government policies, Management planning.  
Identifiers: \*Technology assessment.

Contents:  
Technology assessment:  
Its purpose, method, and scope;  
The past, present and future of technology assessment;  
Technology forecasting:  
How good it is;  
Technology assessment of marine resources development;

Assessment of technologies for the protection and enhancement of the marine environment;  
Requirements of the Congress for Technology Assessment;  
Planning a balanced university program of oceanographic education and research;  
Criteria for corporate investment in ocean research and development;  
Our changing ocean priorities;  
The role of Congress in marine research and resource development;  
The role of the Office of Science and Technology;  
Oceanography - a budgetary controllable whose time may not come;  
Technology;  
Reassessment and reassurance.

**COM-74-11194/9** PC E10/MF E10  
National Technical Information Service, Springfield, Va.  
**Technology Transfer a Bibliography with Abstracts**  
Rept. for 1972-Jun 74  
Edward J. Lehmann. Jul 74, 158p\* Rept no. NTIS-WIN-74-057

Descriptors: \*Technology transfer, \*Bibliographies, Abstracts, Government policies, Developing countries, Feasibility, Aerospace engineering, Medicine, Urban planning, Pollution abatement, Manufacturing.  
Identifiers: Technology assessment, Technology utilization.

The bibliography contains 144 selected abstracts of research reports retrieved using the NTIS on-line search system-NTISearch. The cited reports cover research for the period 1972 to June 1974. Included are topics on Government policies, aid to developing countries, feasibility studies, and NASA aerospace technology transfer to areas such as medicine, urban planning, pollution abatement, and manufacturing.

**COM-74-11487/7** PC E03/MF A01  
Smithsonian Institution, Washington, D.C. Center for the Study of Man.  
**Alternative Economic Development Policies for Indian Communities. Executive Summary**  
Research rept.  
Sam Stanley. Jul 74, 57p EDA/OER-74-324  
Grant EDA-OEP 400-G-71-18  
See also COM-74-11488.  
Paper copy also available in set of 8 reports as COM-74-11486-SET, \$69.00.

Descriptors: \*Economic development, \*American Indians, \*Communities, Policies, Organizations, Leadership, Employment, Income, Natural resources, Commercial practices, Minerals, Fisheries, Woodworking, Handicrafts, Sociology.  
Identifiers: Cherokee Indians, Sioux Indians, Lummi Indians, Morongo Indians, Passamaquoddy Indians, Papago Indians.

The summary of an eight-volume study presents the point of view of the concept of 'economic development' and of efforts to improve conditions in Indian reservations and communities, as well as to pinpoint factors detracting from the success of such efforts. A number of Indians have participated in the seven studies of individual tribes which form the basis for a comparative analysis. The tribes selected for the study are Lummi, Morongo, Navajo, Papago, Eastern Oklahoma Cherokee, Passamaquoddy, Pine Ridge Oglala Sioux.

**COM-74-11489/3** PC E07/MF A01  
Smithsonian Institution, Washington, D.C. Center for the Study of Man.  
**Alternative Economic Development Policies for Indian Communities. Making Do with the Dark Meat: A Report on the Cherokee Indians in Oklahoma**  
Research rept.  
Albert L. Wahrhaftig. Jul 74, 179p EDA/OER-74-324-2  
Grant EDA-OER-400-G-71-18  
See also COM-74-11490.  
Paper copy also available in set of 8 reports as COM-74-11486-SET, PC E99.

Descriptors: \*Economic development, \*American Indians, \*Communities, Policies, Organizations, Leadership, Employment, Income, Natural resources, Commercial practices, Minerals, Fisheries, Woodworking, Handicrafts, Sociology.

Contents: How the Cherokee got that way; How Cherokee settlements survive; The Cherokee establishment.

**COM-74-11490/1** PC E06/MF A01  
Smithsonian Institution, Washington, D.C. Center for the Study of Man.  
**Alternative Economic Development Policies for Indian Communities. The Lummi Indian Community: The Fishermen of the Pacific Northwest**  
Research rept.  
Vine Deloria, Jr. Jul 74, 127p EDA/OER-74-324-3  
Grant EDA-OER-400-G-71-18  
See also COM-74-11491.  
Paper copy also available in set of 8 reports as COM-74-11486-SET, \$69.00.

Descriptors: \*Economic development, \*American Indians, \*Communities, Policies, Organizations, Leadership, Employment, Income, Natural resources, Commercial practices, Minerals, Fisheries, Woodworking, Handicrafts, Sociology.

Contents: The period of white settlement; Early reservation days (1855-1890); The years of poverty (1890-1964); Political development; The Lummi aquaculture project; The Lummi concept; The Lummi experience and other Indian tribes; and Values and goals of the reservation.

**COM-74-11491/9** PC E06/MF A01  
Smithsonian Institution, Washington, D.C. Center for the Study of Man.  
**Alternative Economic Development Policies for Indian Communities. Morongo Indian Reservation: A Century of Adaptive Strategies**  
Research rept.  
Lowell John Bean. Jul 74, 141p EDA/OER-74-324-4  
Grant EDA-OER-400-G-71-18  
See also COM-74-11492.  
Paper copy also available in set of 8 reports as COM-74-11486-SET, \$69.00.

Descriptors: \*Economic development, \*American Indians, \*Communities, Policies, Organizations, Leadership, Employment, Income, Natural resources, Commercial practices, Minerals, Fisheries, Woodworking, Handicrafts, Sociology.

Contents: Tribal background; Leadership develops new strategies; Seven viable expressive-instrumental associations; Morongo and the Mission Indian subculture; Ethnic identity at Morongo; Economic development and political affairs.

**COM-74-11492/7** PC E05/MF A01  
Smithsonian Institution, Washington, D.C. Center for the Study of Man.  
**Alternative Economic Development Policies for Indian Communities. Dressing for the Window: Papago Indians and Economic Development**  
Research rept.  
Henry F. Manuel, Juliann Ramon, and Bernard L. Fontana. Jul 74, 109p EDA/OER-74-324-5  
Grant EDA-OER-400-G-71-18  
See also COM-74-11493.  
Paper copy also available in set of 8 reports as COM-74-11486-SET, \$69.00.

Descriptors: \*Economic development, \*American Indians, \*Communities, Policies, Organizations, Leadership, Employment, Income, Natural resources, Commercial practices, Minerals, Fisheries, Woodworking, Handicrafts, Sociology.

Contents: The Papago reservation; Subsistence in Pimeria Alta; The new economy; Ruling elite; Case studies.

**COM-74-11493/5** PC E06/MF A01  
Smithsonian Institution, Washington, D.C. Center for the Study of Man.



## Alternative Economic Development Policies for Indian Communities. Pine Ridge Economy: Cultural and Historical Perspectives

Research rept.  
Raymond J. DeMallie. Jul 74, 130p EDA/OER-74-324-6  
Grant EDA-OER-400-G-71-18  
See also COM-74-11494.  
Paper copy also available in set of 8 reports as COM-74-11486-SET, \$69.00.

Descriptors: \*Economic development, \*American Indians, \*Communities, Policies, Organizations, Leadership, Employment, Income, Natural resources, Commercial practices, Minerals, Fisheries, Woodworking, Handicrafts, Sociology.

Contents: Cultural background; Historical background; Pine Ridge reservation today; Planned economic development.

**COM-74-11494/3** PC E07/MF A01  
Smithsonian Institution, Washington, D.C. Center for the Study of Man.

## Alternative Economic Development Policies for Indian Communities. Passamaquoddy Economic Development in Cultural and Historical Perspective

Research rept.  
Susan MacCulloch Stevens. Jul 74, 173p EDA/OER-74-324-7  
Grant EDA-OER-400-G-71-18  
See also COM-74-11486.  
Paper copy also available in set of 8 reports as COM-74-11486-SET, \$69.00.

Descriptors: \*Economic development, \*American Indians, \*Communities, Policies, Organizations, Leadership, Employment, Income, Natural resources, Commercial practices, Minerals, Fisheries, Woodworking, Handicrafts, Sociology.

Contents: Cultural and historical setting; Social institutions; Overall organization of the community; Relationships to the outside world; History of the Passamaquoddy; Factors affecting economic development; Products, services and markets; Psycho-social factors affecting work patterns and economic development; Implementation of federal social programs.

**COM-74-11645/0** PC A03/MF A01  
National Bureau of Standards, Washington, D.C. Center for Building Technology.

## FY 1973 Progress Report on Design Criteria and Methodology for Construction of Low-Rise Buildings to Better Resist Typhoons and Hurricanes

Final rept.  
N. J. Raufaste, and R. D. Marshall. 2 Jul 73, 32p Rept no. NBSIR-74-582  
Grant PASA-TA(CE)-04-73

Descriptors: \*Houses, \*Wind(Meteorology), \*Design criteria, Construction, Construction materials, Typhoons, Hurricanes, Wind tunnel models, Developing countries.

This report highlights the major accomplishments of the initial phase of a three fiscal year project to provide engineering technical assistance to the Agency for International Development (AID) for the development of design criteria for low-cost/low-rise buildings to better withstand the effects of extreme winds. This phase represents approximately a 3 month level of effort. During this period CBT project staff members commenced six introductory tasks. These tasks will set the pace for the second fiscal year level of effort. The tasks included: initiate dialogue with local organizations and institutes in developing countries, establish a local Philippine advisory committee; conduct on-site visits to developing countries to identify local professional candidates for short term consulting; conduct on-site visits to developed countries to collect information from research centers; purchase initial wind tunnel and full-scale field test instrumentation; and commence library search of related subject documents.

**COM-74-11781/3** PC A02  
Rhode Island Univ., Kingston. Dept. of Sociology and Anthropology.

## A Fisherman's Co-operative: Open System Theory Applied

Carl Gersuny, and John J. Poggie, Jr. 1974, 11p Marine Reprint-25, NOAA-74102402  
Grant NOAA-04-3-158-3  
Pub. in Marit. Stud. Mgmt., v1 p215-222 1974.

Descriptors: \*Fish marketing, \*Commercial fishing, \*Cooperative enterprises, Prices, Costs, Fishing equipment, New England.  
Identifiers: Reprints, Sea Grant program.

There are about eighty co-operative associations in the commercial fisheries of the United States. Of these, the Point Judith Fishermen's Co-operative Association is one of the most successful. Fishermen are motivated to band together in such organizations by the payment of low prices by fish dealers, by high individual costs in getting fish to the market, by the inordinate expense of money and time in obtaining equipment on a retail, individual basis, and by an unsatisfactory supply of producer services beneficial to fishing. As a case study to illustrate and analyse the functioning of co-operative within the framework of Thompson's open system theory the Point Judith Fishermen's Co-operative Association is described.

**COM-74-50182/6** PC GPO/MF A01-NTIS  
National Bureau of Standards, Washington, D.C.

## Some References on Metric Information with Charts on All You Need to Know About Metric; Metric Conversion Factors

Special pub.  
W. Small. Dec 73, 13p Rept no. NBS-SP-389  
Paper copy available from GPO \$0.25 as C13.10:389.

Descriptors: \*Metric system, Conversion, Tables(Data).  
Identifiers: NBS.

As metric use increases in this country, interest in metric information is also increasing. This booklet was developed to provide a listing of sources for pertinent metric information. Included is a list of publications produced by the National Bureau of Standards and available from the Superintendent of Documents. Also included is a list assembled by the National Council of Teachers of Mathematics of organizations that market metric materials for educators, and a list of additional sources of metric information.

**COM-74-50184/2** PC GPO/MF A01-NTIS  
National Bureau of Standards, Washington, D.C. Center for Building Technology.

## Design, Siting, and Construction of Low-Cost Housing and Community Buildings to Better Withstand Earthquakes and Windstorms

Final rept.  
William F. Repts, and Emil Simiu. Jan 74, 153p Rept no. NBS-BSS-48  
Sponsored in part by Agency for International Development, Washington, D.C.  
Paper copy available from GPO \$4.85 as C13.29/2:48.

Descriptors: \*Buildings, \*Environmental engineering, \*Storms, \*Earthquakes, Turkey, Peru, Philippine Islands, Developing countries, Earthquake resistant structures, Avalanches, Site surveys, Structural engineering, Disasters.  
Identifiers: \*Low cost housing, \*Windstorms, NBS.

The report provides technical information regarding characteristics of materials and building systems, and discusses the structural performance of buildings subjected to the action of earthquakes and wind forces with specific reference to structures typical of developing countries. Potential ways are described in which structures can be made more resistant to such action. Siting considerations are discussed from a geological, seismic and climatological viewpoint, and recommendations relating to siting problems are made. Techniques of housing construction, both traditional and industrialized, are described and improvements resulting in better earthquake or windstorm resistance are suggested. Building codes, their improvement and their enforcement are also discussed.

**COM-74-50189-01-05**

(Order as COM-74-50189-01)  
United Nations Development Program, Manila (Philippines).

## A Review of the Indonesian Shrimp Fishery and Its Present Developments

Foreign fisheries leaflet  
M. Unar. 1974, 11p NMFS-FFL-73-16, MFR-Paper-1030  
Included in Marine Fisheries Review, v36 n1 p21-30 Jan 74, COM-74-50189-01.

Descriptors: \*Shrimp fisheries, \*Indonesia, Food supply, Food storage, Economic development, Fishing grounds, Fishing industry, Reviews.  
Identifiers: NOAA.

In 1968 joint ventures involving foreign capital were established in shrimp fisheries in several parts of Indonesia, particularly in the Sumatra, Kalimantan, and West Irian regions. This has given rise to the establishment of new small shrimp centers such as those in Kotabaru, on the island of Pulau Laut in southeast Kalimantan, Ambon and Sorong.

**COM-74-50522/3** PC GPO/MF A01-NTIS  
Economic Development Administration, Washington, D.C.

## The Potential of Handcrafts as a Viable Economic Force - An Overview

May 74, 56p  
Paper copy available from GPO \$0.65.

Descriptors: \*Crafts, \*Marketing, Craftsmen, Skills, Financing, Designers, Economic factors, Operating costs, Blighted areas.  
Identifiers: \*Handicrafts, Design crafts.

Handcrafts are considered to be an emerging and viable economic force, but their impact must be viewed relative to their setting. They often may generate jobs and income in areas that offer only meager alternatives. Handcrafts preserve our national folk heritage, contribute to our cultural traditions, and provide both recreational and therapeutic benefits to handicapped persons, the elderly, and others. Crafts can be produced, individually, by sophisticated urban-oriented artisans and by isolated mountaineers; by urban or rural cooperatives; by such ethnic groups as Indians, Mexican-Americans, and Alaskan Natives; and by craft centers, where volume production is combined with hand skills. There is growing market for quality crafts that can be supplied in quantity and dependably.

**COM-74-51230/2** PC GPO/MF A01-NTIS  
National Bureau of Standards, Washington, D.C. Center for Building Technology.

## FY 74 Progress Report on Design Criteria and Methodology for Construction of Low-Rise Buildings to Resist Typhoons and Hurricanes

Interim rept. 1 Jul 73-30 Jun 74 (Final)  
Noel J. Raufaste, Jr., and Richard D. Marshall. Jul 74, 277p Rept no. NBSIR-74-567  
Grant PASA-TA(CE)-04-73  
Paper copy available from GPO.

Descriptors: \*Residential buildings, \*Environmental engineering, \*Wind pressure, Typhoons, Hurricanes, Developing countries, Technical assistance, Design criteria, Technology transfer, Wind tunnel models, Meetings, Test facilities, Workshops, Loads(Forces), Gust loads.  
Identifiers: Low rise buildings, Wind resistant buildings.

This report gives the major accomplishments of the second phase of a three year project to develop improved design criteria for low-rise buildings that better resist extreme winds. During FY 74, the Center for Building Technology commenced several tasks which will serve as major inputs to the development of improved design criteria. These tasks include: (1) selecting two more field test sites in the Philippines, (2) instrumenting four full scale houses, (3) instrumenting the University of Philippines wind tunnel facility, (4) participating in a 1973 International workshop at Manila, and (5) helping develop in Bangladesh and Jamaica a methodology for the transfer of technology.



# APPROPRIATE TECHNOLOGY ABSTRACTS

**COM-75-10241/8** PC A02  
State Univ. of New York, Stony Brook. Marine Sciences Research Center.  
**Inexpensive Modular Habitats for Juvenile Lobsters ('Homarus americanus')**  
Matoira H. Chanley, and Orville W. Terry. 14 Mar 74, 5p NOAA-74123102  
Grant NOAA-2-35281  
Pub. in Aquaculture, v4 p89-92 1974. Prepared in cooperation with Suffolk County Community Coll., Selden, N.Y.

Descriptors: \*Lobsters, \*Aquaculture, Shellfish, Larvae, Design, Diagrams.  
Identifiers: Reprints, Homarus americanus, Habitats.

The paper presents details of a device which is suitable for use as a rearing habitat for juvenile lobsters (genus Homarus) from the fourth stage to a size with a carapace length of about 2.7 cm. The device is thought to be original and an improvement over others previously reported.

**COM-75-10263/2** PC A02  
Puerto Rico Univ., Mayaguez. Dept. of Marine Sciences.  
**Opercular Algal Growth on the Cichlid Fish 'Tilapia aurea', Cultured in Sea Water**  
James W. Miller, and David L. Ballantine. 1974, 5p NOAA-75021303  
Pub. in Aquaculture, v4 p93-95 1974.

Descriptors: \*Aquaculture, \*Animal diseases, \*Fishes, Vibrio, Bacterial diseases, Infectious diseases, Algae, Sea water, Chlorophyta, Aeromonas, Phaeophyta.  
Identifiers: Reprints, Tilapia aurea.

Enteromorpha lingulata (Chlorophyta) and Giffordia mitchellae (Phaeophyta) were found growing on opercula of Tilapia aurea cultured in sea water. Fish observed had mild Vibrio and Aeromonas bacterial infections, manifested by abscesses on their opercula and other areas of the body. Algal growth was observed only on the operculum, which appears to be a more suitable attachment site due to its bony nature. Abscessed areas on opercula were devoid of scales. Mechanical abrasion resulting in scale loss appears to provide a suitable attachment site for algae. Plants examined were small, up to six mm in length. Tufts of algae covered opercular abscesses. Fish did not appear to be attracted to tufts of algae growing on other fish; all fish appeared normal in behavior, exhibiting a positive response to feeding and satisfactory growth.

**COM-75-10394/5** PC A08/MF A01  
Puerto Rico Univ., Mayaguez. Dept. of Marine Sciences.  
**The Development of Cultures of the Channel Catfish 'Ictalurus punctatus' and 'Tilapia' Species in Puerto Rico**  
Final rept. 1 Jul 71-30 Jun 74  
Francisco A. Pagan-Font. 30 Jun 74, 174p  
NOAA-75022110

Descriptors: \*Catfishes, \*Aquaculture, Fishes, Fisheries, Puerto Rico, Cultures(Biology), Recommendations, Salinity, Temperature, Feeding stuffs.  
Identifiers: Channel catfish, Ictalurus punctatus, Tilapia aurea.

Polyculture of channel catfish with Tilapia spp. was demonstrated. Recommended harvest size for catfish is 350 g obtainable in one year. T. aurea can produce three crops per year at a weight of over 68.1 g per fish. Sugar mill waste, rum and beer distillery wastes, tuna stickwater, pharmaceutical yeasts, and chicken manure were found to be of possible use as local fish feeds. Raceway cultures were found to be expensive and are not recommended at this time. In polyculture trials it was found that 9000 kg per hectare per year may be attained. The Lajas Valley appears to be most suitable for fish culture where some 700 acres, which is too saline for agricultural purposes, could be used.

**COM-75-11378/7** PC A04/MF A01  
National Marine Fisheries Service, Gloucester, Mass. Atlantic Fishery Products Technology Center.  
**A Study: Expanded Processing Techniques, Production Costs and Market Survey of Underutilized Fish Species**  
Technical assistance rept.  
J. M. Mendelsohn. May 74, 60p\* EDA-75-05  
Grant EDA-01-6-09131-2

Descriptors: \*Fishes, \*Economic development, \*Market research, Abundance, Food processing, Food consumption, Food preparation, Food storage, Drying, Feasibility, Acceptability.  
Identifiers: \*Merluccius bilinearis, \*Market surveys, Fish products, Technical assistance, \*Fish cakes.

The program was carried out by the Atlantic Fishery Products Technology Center (AFPTC), National Marine Fisheries Service (NMFS) under a one-year contract with the Economic Development Administration (EDA), U.S. Department of Commerce. The contract called for implementing the results of a previous study (A Study to Develop New Products from Whiting or Other Underutilized Species,) in which new products having commercial potential were prepared on a laboratory scale from seasonally abundant and underutilized whiting (Merluccius bilinearis) and similar species.

**COM-75-50001/7** PC-GPO/MF A01-NTIS  
National Bureau of Standards, Washington, D.C. Center for Building Technology.  
**Development of Improved Design Criteria for Low-Rise Buildings in Developing Countries to Better Resist the Effects of Extreme Winds. Proceedings of a Workshop Held at the Dr. Paulino J. Garcia Memorial Hall, National Science Development Board, Manila, Philippines, November 14-17, 1973**  
Building science series rept.  
Noel J. Raufaste, Jr. and Richard D. Marshall. Oct 74, 169p\* Rept no. NBS-BSS-56  
Grant PASA-TA(CE)-04-73  
Library of Congress Catalog Card no. 74-600158.  
Paper copy available from GPO as C13.29/2:56.

Descriptors: \*Buildings, \*Wind pressure, \*Storms, \*Developing countries, Meetings, Design criteria, Dynamic structural analysis, Hurricanes, Damage control, Management information systems, Recommendations.  
Identifiers: \*Wind resistant buildings, \*Low rise buildings.

A 1973 international workshop held in Manila, Philippines, addressed the state-of-the-art in mitigating building damages from winds. The workshop was jointly sponsored by the United States Agency for International Development (USAID), a Philippine advisory committee, and the U.S. National Bureau of Standards (NBS). This report presents the proceedings derived from the workshop. The proceedings present recommendations, the workshop program, five reports, and nine technical articles. The technical articles addressed four primary topics which were used to guide subsequent workshop discussions. The topics addressed were: wind and aerodynamics, structural related technology, socio-economic and architectural considerations, and codes and standards. The results of the workshop suggest improved building practices for developing countries and the development of improved design criteria for low-rise buildings to better resist the effects of extreme winds.

**COM-75-50185-03-05** (Order as COM-75-50185-03)  
Texas A and M Univ., College Station. Dept. of Marketing.  
**An Analysis of Prices Paid to Fishermen Before and After the Establishment of a Fishery Cooperative**  
Charles W. Lamb, Jr. Mar 75, 4p MFR-Paper-1130  
Grant NOAA-2-35364  
Included in Marine Fisheries Review, v37 n3 p36-38 Mar 75.

Descriptors: \*Fish industry, \*Cooperatives, Objectives, Fish harvesting, Prices, Fish economics, Food storage, Food processing, Exports, Marketing.

Identifiers: Sea Grant program.

'A fishery cooperative consists of a group of individual fishermen acting together for mutual benefit and is designed to accomplish group objectives.' These group objectives are primarily economic in nature and often directly related to the prices paid to the fishermen for their catch. Common motivations to create fishery cooperatives include excessive price fluctuations, weakness of prices at the primary producer level, and/or insufficient storage and processing facilities. The paper reports the findings of a case study which compared the prices received by fishermen prior to and after the establishment of a unique fishery cooperative organization.

**COM-75-50192-03-04** (Order as COM-75-50192-03)  
National Marine Fisheries Service, Seattle, Wash. Northwest Fisheries Center.  
**Selective and Unselective Exploitation of Experimental Populations of 'Tilapia mossambica'**  
Ralph P. Silliman. Dec 74, 14p NOAA-75090808-4  
Included in Fishery Bull., v73 n3 p495-507 Jul 75.

Descriptors: \*Fishes, \*Aquaculture, Growth, Mortality, Food habits, Breeding, Weight(Mass), Comparison, Selection, Economic factors, Mathematical models, Genetics.  
Identifiers: \*Tilapia mossambica, Fish stocks.

Two populations of Tilapia Mossambica were grown under controlled conditions. After a period of growth and stabilization at about 10 kg and 200 fish, exploitation was started; about 50 fish of outside stock were added to each population to increase genetic variability. Recruitment was estimated from data of stock, mortality, and catch. Parabolas fitted to the stock-recruitment relation suggested greater recruitment in the selectively fished stock than in the unselectively fished one. The exploitation-yield relation was assessed by fitting Fox surplus-yield models to both populations.

**CONF-730560-1** PC A02/MF A01  
Sydney Univ. (Australia).  
**Alternative Energy Sources: A Research Challenge**  
D. W. George. 1973, 21p  
U.S. Sales Only.

Descriptors: \*Energy sources, \*Australia, \*Tidal power, \*Research programs, \*Wind, Research programs, \*Geothermal energy, Research programs, Economics, Energy consumption, Energy conversion, Energy source conservation, Environment, Fossil fuels, Fuel cells, Hydroelectric power, Magnetohydrodynamics, Natural gas, Solar energy.  
Identifiers: AEC.

For abstract, see NSA 28 11, number 29382.

**CONF-750712-12** PC A02/MF A01  
Commonwealth Scientific and Industrial Research Organization, Melbourne (Australia).  
**Solar Energy for the Australian Food Processing Industry**  
D. Proctor, and R. N. Morse. 1975, 13p  
Annual meeting of the International Solar Energy Society, Los Angeles, California, USA, 28 Jul 1975. U.S. Sales Only.

Descriptors: \*Solar dryers, \*Solar drying, Agriculture, Economics, Feasibility studies, Process heat, Temperature dependence.  
Identifiers: ERDA/140905, ERDA/299001, Australia, \*Food industry, Industries, Cost effectiveness.

Since the cost effectiveness of solar heat-generating systems decreases as the temperature increases, the potential for large-scale use of solar energy for industrial processes is very dependent on the operating temperature of the process. Examination of a sample of the Australian food-processing industry has shown that 70 percent of the heat is used at temperatures below 100 exp 0 C and there is no significant usage above 150 exp 0 C. A feasibility study of a typical plant in Melbourne shows that it is technically practicable to phase



solar energy heating systems into existing processes, and that, using known techniques, over 50 percent of the annual heat requirements could be provided by solar collectors. The roof area is adequate for the mounting of collectors but space must be found for insulated hot-water tanks to provide thermal storage. Since the gross return on investment in the solar installation is the value of the fuel saved, this is directly related to fuel prices. In a situation where energy prices are changing rapidly, recommendations on cost effectiveness have no lasting significance. The paper describes simple methods of making accurate predictions for specific situations so that plant owners and operators can make their own judgements on cost effectiveness. (ERA citation 01:018935)

**CONF-750761-1** PC A02/MF A01  
Commonwealth Scientific and Industrial Research Organization, East Melbourne (Australia).  
**Application of Solar Energy in the Food Processing Industry**  
D. Proctor, and R. F. White. 1975, 9p  
Meeting on applications of solar energy research and development in Australia, Melbourne, Australia, 2 Jul 1975.  
U.S. Sales Only.

Descriptors: \*Solar collectors, \*Solar drying, \*Process heat, Agriculture, Food, Economics, Industry.  
Identifiers: ERDA/140905, ERDA/299001, Australia, \*Food industry, Industries.

In the food processing industries investigated in this study, the major portion of the heat requirements were in processes operated with temperatures in the 60 to 80 exp 0 C range. Most of the process energy was required at constant temperature. An example of a factor is given to illustrate how solar energy can be integrated with conventional fuel so that the solar input is about 58 percent of the annual energy usage. It shows that currently available commercial collectors can operate with a positive return on investment within the life of the plant for process temperatures below 50 exp 0 C, but it also highlights the need for an improved commercial collector capable of producing high-temperature water. (ERA citation 01:018936)

**CONF-760536-1** PC A02/MF A01  
Oak Ridge National Lab., Tenn.  
**Potential for Energy Conservation Technology Transfer**  
E. C. Hise. 1976, 11p  
Southern interstate nuclear board meeting, Winston-Salem, North Carolina, United States of America (USA), 24 May 1976.

Descriptors: \*Commercial buildings, \*Energy conservation, \*Energy consumption, \*Houses, Technology transfer, Air conditioning, Capital, Economics, Efficiency, Engineering, Environmental effects, Furnaces, Government policies, Heat pumps, Modifications, Sociology, Space heating, Standards, Thermal insulation, Water heaters.  
Identifiers: ERDA/291000, ERDA/320100, \*Residential buildings, Hot water heating.

The segment of energy consumption related to space conditioning and water heating in residential, commercial, and institutional buildings is discussed specifically. Within this constraint building energy consumption is discussed, considering three choices: drastic alteration of life style; even greater energy operating costs; or relatively large capital expenditures to reduce building energy consumption. It is concluded that the average existing residence can, through insulation, reduce its energy consumption to 60 percent of present for an expenditure of \$500 to \$1000 and a pay back of 5 to 10 years. The average existing commercial or institutional building can save even more, although their construction may require less commonplace insulation methods than residences. New construction can show greater energy savings at little or no additional construction cost. From data contained in reports in the bibliography (10 items), the author again concludes that the average existing residential heating/cooling system (equipment) can be modified or replaced to reduce its energy consumption to 60 percent or even 40 percent of the present at a cost of a few hundred to \$3000 as a function of the problem. The possible savings in

commercial and institutional buildings are equally great. (ERA citation 01:019507)

**CONF-770140-** PC A13/MF A01  
Illinois Univ., Urbana.  
**Solar Grain Drying Conference Proceedings**  
G. C. Shove. Oct 77, 286p  
National solar grain drying conference, Champaign, IL, USA, 11 Jan 1977.

Descriptors: \*Cereals, \*Solar drying, \*Meetings, Agriculture, Leading abstract, Seeds.  
Identifiers: ERDA/140905, ERDA/553000, Crop driers, \*Grain crops, Proceedings.

Thirty papers are included. A separate abstract was prepared for each paper. (ERA citation 03:042498)

**CONF-770367-** PC A15/MF A01  
Ohio Agricultural Research and Development Center, Wooster.  
**Proceedings of a Conference on Solar Energy for Heating Greenhouses and Greenhouse-Residential Combinations**  
T. E. Bond, L. C. Godbey, and H. F. Zornig. Nov 77, 350p  
Conference on solar energy for greenhouses and greenhouse-residential combinations, Cleveland, OH, USA, 20 Mar 1977.

Descriptors: \*Greenhouses, \*Solar heating systems, \*Meetings, Agriculture, Food industry, Leading abstract.  
Identifiers: ERDA/140901, ERDA/299001, ERDA/553000.

Seventeen papers are included. A separate abstract was prepared for each for Energy Research Abstracts (ERA); eight are included in Energy Abstracts for Policy Analysis (EAPA). (ERA citation 03:030595)

**COO-2390-15** PC A02/MF A01  
Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.  
**Needs and Opportunities for Ceramic Science and Technology**  
W. D. Kingery. 1976, 12p Rept no. CONF-7605158-1  
Contract EY-76-S-02-2390  
International meeting on modern ceramic technology, Rimini, Italy, 26 May 1976.

Descriptors: \*Ceramics, \*Industrial plants, Capital, Demand factors, Energy consumption, Energy demand, Environmental effects, Manufacturing, Materials, Resources, Technology assessment.  
Identifiers: ERDA/320302, ERDA/320302, Investments, Manpower, Energy requirements, Fabrication, Ceramics industry, Industries.

There clearly seems to be a consensus developing that technological requirements, including ceramics, will be sought in the next few decades with regard to (1) substituting common and readily available materials for rarer and therefore diminishing resources, (2) making strong efforts to either conserve energy or develop new sources of energy, (3) protecting the environment, and (4) providing opportunities for more worker satisfaction. An attempt is made to relate these objectives to needs and opportunities for ceramics. The following considerations are discussed in reference to the ceramic industry: labor-capital requirements, materials resource requirements, energy requirements, environmental requirements, fabrication requirements, and new product requirements. (ERA citation 02:057032)

**COO/2829-1** PC A06/MF A01  
InterTechnology Corp., Warrenton, Va.  
**Analysis of the Economic Potential of Solar Thermal Energy to Provide Industrial Process Heat. Final Report, Volume I**  
7 Feb 77, 120p  
Contract EY-76-C-02-2829

Descriptors: \*Agriculture, \*Industrial plants, \*Process heat, \*Solar collectors, \*Solar cookers, \*solar drying, \*Solar furnaces, \*Solar kilns, \*Solar stills, \*Solar water heaters, Automobile industry, Boilers,

Building materials, Chemical industry, Coal industry, Concentrating collectors, Cost, Economics, Environmental effects, Fertilizers, Financial incentives, Flat plate collectors, Food industry, Glass industry, Industry, Legal aspects, Life-cycle cost, Mathematical models, Meat industry, Metal industry, Mineral industry, Ore processing, Paper industry, Petroleum industry, Site selection, Solar cooking, Solar distillation, Solar dryers, Synthetic fuels industry, Technology assessment.  
Identifiers: ERDA/140905, ERDA/141000, ERDA/299001, ERDA/140300, ERDA/140909, Textile industry, Industries, Solar water heating.

The process heat data base assembled as the result of this survey includes specific process applications from 78 four-digit Standard Industrial Classification (SIC) groups. These applications account for the consumption of 9.81 quadrillion Btu in 1974, about 59 percent of the 16.6 quadrillion Btu estimated to have been used for all process heat in 1974. About 7 exp 1 / sub 2 percent of industrial process heat is used below 212 exp 0 F (100 exp 0 C), and 28 percent below 550 exp 0 F (288 exp 0 C). In this study, the quantitative assessment of the potential of solar thermal energy systems to provide industrial process heat indicates that solar energy has a maximum potential to provide 0.6 quadrillion Btu per year in 1985, and 7.3 quadrillion Btu per year in 2000, in economic competition with the projected costs of conventional fossil fuels for applications having a maximum required temperature of 550 exp 0 (288 exp 0 C). A wide variety of collector types were compared for performance and cost characteristics. Performance calculations were carried out for a baseline solar system providing hot water in representative cities in six geographical regions within the U.S. Specific industries that should have significant potential for solar process heat for a variety of reasons include food, textiles, chemicals, and primary metals. Lumber and wood products, and paper and allied products also appear to have significant potential. However, good potential applications for solar process heat can be found across the board throughout industry. Finally, an assessment of nontechnical issues that may influence the use of solar process heat in industry showed that the most important issues are the establishment of solar rights, standardization and certification for solar components and systems, and resolution of certain labor-related issues. (Volume 1 of 3 volumes.). (ERA citation 02:058733)

**COO/2829-2** PC A99/MF A01  
InterTechnology Corp., Warrenton, Va.  
**Analysis of the Economic Potential of Solar Thermal Energy to Provide Industrial Process Heat. Final Report, Volume II**  
7 Feb 77, 1234p  
Contract EY-76-C-02-2829

Descriptors: \*Industrial plants, \*Process heat, \*Solar air heaters, \*Solar collectors, \*Solar cookers, \*Solar dryers, \*Solar furnaces, \*Solar kilns, \*Solar stills, \*Solar water heaters, Agriculture, Automobile industry, Boilers, Building materials, Chemical industry, Coal industry, Concentrating collectors, Cost, Economics, Environmental effects, Fertilizers, Financial incentives, Flat plate collectors, Food industry, Glass industry, Industry, Legal aspects, Life-cycle cost, Mathematical models, Meat industry, Metal industry, Mineral industry, Ore processing, Paper industry, Petroleum industry, Site selection, Solar cooking, Solar distillation, Solar drying, Synthetic fuels industry.  
Identifiers: ERDA/140905, ERDA/141000, ERDA/140300, ERDA/140909, ERDA/299001.

This report is Volume 2 of three volumes. For abstract see Volume I, report COO/2829-1. (ERA citation 02:058734)

**COO/2829-3** PC A99/MF A01  
InterTechnology Corp., Warrenton, Va.  
**Analysis of the Economic Potential of Solar Thermal Energy to Provide Industrial Process Heat. Final Report, Volume III**  
7 Feb 77, 819p  
Contract EY-76-C-02-2829

Descriptors: \*Industrial plants, \*Process heat, \*Solar air heaters, \*Solar collectors, \*Solar cookers, \*Solar dryers, \*Solar furnaces, \*Solar kilns,



\*Solar stills, \*Solar water heaters, Agriculture, Automobile industry, Boilers, Building materials, Chemical industry, Coal industry, Concentrating collectors, Cost, Economics, Environmental effects, Fertilizers, Financial incentives, Flat plate collectors, Food industry, Glass industry, Industry, Legal aspects, Life-cycle cost, Mathematical models, Meat industry, Metal industry, Mineral industry, Ore processing, Paper industry, Petroleum industry, Site selection, Solar cooking, Solar distillation, Solar drying, Synthetic fuels industry.  
 Identifiers: ERDA/140905, ERDA/141000, ERDA/140300, ERDA/140909, ERDA/299001.

This report is Volume 3 of three volumes. For abstract, see Volume I, report COO/2829--1. (ERA citation 02:058735)

**COO-2917-10** PC A03/MF A01  
 Illinois Univ. at Urbana Champaign. Dept. of Civil and Ceramic Engineering.  
**Biological Conversion of Biomass to Methane. Quarterly Progress Report, January 21--April 30, 1978**  
 J. T. Pfeffer. May 78, 27p  
 Contract EY-76-S-02-2917

Descriptors: \*Agricultural wastes, \*Methane, Anaerobic digestion, Animal feeds, Biosynthesis, Centrifugation, Filtration, Maize, Research programs, Slurries, Water removal.  
 Identifiers: ERDA/090122, ERDA/140504, Synthetic fuels, Manufactured gas, Solid waste disposal.

The results of a series of tests to evaluate the methane yield from the anaerobic digestion of corn stover are reported. The corn stover, consisting of cob, stalks, and leaves, was milled to pass through a 3.2 mm screen. Particle size distributions were determined. Data are tabulated on the gas production. Centrifugation and vacuum filtration were investigated for slurry dewatering. Gas production was low and corn stover does not appear to offer any potential as a methane source. In addition the protein content of the slurry solids was not sufficient for a satisfactory protein animal feed. (ERA citation 04:005415)

**COO/2917-3(V.1)** PC A10/MF A01  
 Illinois Univ. at Urbana Champaign. Dept. of Civil Engineering.  
**Biological Conversion of Organic Refuse to Methane. Final Report, July 1, 1973--November 30, 1976**  
 J. W. Brown, J. T. Pfeffer, and J. C. Liebman.  
 Nov 76, 201p  
 Contract EY-76-S-02-2917

Descriptors: \*Methane, \*Municipal wastes, Additives, Anaerobic digestion, Biosynthesis, By-products, Calorific value, Cellulose, Centrifugation, Chemical reaction kinetics, Diagrams, Fermentation, Filtration, Flowsheets, Iron sulfates, Lignin, Liquid wastes, Nutrients, Performance testing, Recycling, Research programs, Residues, Sewage, Sludges, Slurries, Sodium hydroxides, Tables, Viscosity.  
 Identifiers: ERDA/140504, ERDA/090122, Synthetic fuels, Manufactured gas, Solid wastes, Refuse derived fuels.

In order to predict accurately the cost of producing methane from urban refuse, studies were initiated on the dewatering of the fermentor residue and the disposal of the residue from the system. Results of the research are reported under the following subject headings: fermentation system; rheological properties of reactor slurry; filterability of reactor effluent; residue dewatering--vacuum filtration; settleability of solids in the reactor effluent; settleability of sludges from centrate treatment; centrifugation of reactor effluent; leachate potential of dewatered reactor residue; calorific value of the reactor residue; residue incineration; the production of panelboards; caustic treatment of digester feed; and, treatment of filtrate--centrate. Appendixes A, B, D, and E are included; Appendix C, which includes computer programs and documentation, is bound separately as Volume II of this report. (ERA citation 03:011893)

**COO/2917-3(V.2)** PC A06/MF A01  
 Illinois Univ. at Urbana Champaign. Dept. of Civil Engineering.  
**Biological Conversion of Organic Refuse to Methane. Final Report, July 1, 1973--November 30, 1976**  
 G. E. Quindry, J. C. Liebman, and J. T. Pfeffer.  
 Nov 76, 109p  
 Contract EY-76-S-02-2917

Descriptors: \*Bioconversion, \*Methane, \*Municipal wastes, Additives, Anaerobic digestion, Biosynthesis, Capital, Computer codes, Economics, Equipment, Fermentation, Mathematical models, Research programs, Sewage, Simulation, Sodium hydroxides.  
 Identifiers: ERDA/140504, ERDA/090122, Synthetic fuels, Manufactured gas, Solid wastes.

In order to predict accurately the cost of producing methane from urban refuse, studies were initiated on the dewatering of the fermentor residue and the disposal of the residue from the system. Experimental procedures and data are reported in Volume I of this series; related computer programs and documentation are reported in Appendix C, bound separately as Volume II. This appendix contains detailed information on the simulation model. It is divided into five major sections; logic flow and notes, simulation results, definition of major program variables, program listing, and sample output. The section on simulation results includes an analysis of the system under various operating conditions. The program was implemented on the University of Illinois DEC-10 system. (ERA citation 03:009932)

**COO/2917-4** PC A03/MF A01  
 Illinois Univ. at Urbana-Champaign. Dept. of Civil and Ceramic Engineering.  
**Biological Conversion of Biomass to Methane. Quarterly Progress Report, December 1, 1976--March 31, 1977**  
 J. T. Pfeffer. Apr 77, 26p  
 Contract EY-76-S-02-2917

Descriptors: \*Manures, \*Methane, Biosynthesis, Cattle, Containers, Fermentation, Laboratory equipment, Mixing, Research programs.  
 Identifiers: ERDA/140504, ERDA/090122, \*Synthetic fuels, Manufactured gas, Agriculture wastes.

Progress is reported in research on the development of optimum conditions for the production of methane from organic materials by fermentation. Beef lot and dairy herd manures were used in tests of three types of reactors constructed for the study. They are complete mixed, two-stage, and plug flow reactors. Although there are variations in the data collected, preliminary results indicate that the complete mix reactor exhibits better methane production than either of the other two reactor designs. (ERA citation 03:006209)

**COO/2917-5** PC A05/MF A01  
 Illinois Univ. at Urbana-Champaign. Dept. of Civil and Ceramic Engineering.  
**Biological Conversion of Biomass to Methane. Annual Progress Report, June 1, 1976--May 31, 1977**  
 J. T. Pfeffer. Jun 77, 78p  
 Contract EY-76-S-02-2917

Descriptors: \*Manures, \*Methane, Anaerobic digestion, Bench-scale experiments, Biosynthesis, Cattle, Comparative evaluations, Configuration, Diagrams, Fermentation, Gas yields, Laboratory equipment, Tables.  
 Identifiers: ERDA/140504, ERDA/090122, Manufactured gas, Solid wastes, Synthetic fuels.

A large scale laboratory system was constructed to evaluate the methane yields from various organic materials. The initial substrate for these studies was beef feed lot manure. Methane yields ranged from 0.11 to 0.259 m exp 3 per kg volatile solids fed with a fermentation temperature of 58 exp 0 C. The gas yield for a given manure was a function of retention time. However, fresh manure produced substantially more gas than manure that had been on the lots for several months. Retention times of 3.7 days and loadings of 8.76 kg per m exp 3 per day resulted in stable operation. The results of a separate study of the effect of reactor type on

methane production showed that if a balanced population of organisms can be maintained in the initial stage, a multi-stage fermentation is more efficient than a complete-mix system. However, when the system is stressed, failure of the multi-stage system is more rapid. If the objective is to maximize the conversion of solids to methane, a staged system will produce more methane per unit volume of reactor. If the objective is to maximize methane production per unit volume of reactor, a single stage complete-mix reactor operating at near the critical retention time is required. (ERA citation 03:023375)

**COO/2917-7** PC A02/MF A01  
 Illinois Univ., Urbana. Dept. of Civil Engineering.  
**Biological Conversion of Biomass to Methane. Quarterly Progress Report**  
 J. T. Pfeffer. Jan 78, 6p  
 Contract EY-76-S-02-2917

Descriptors: \*Agricultural wastes, \*Biomass, \*Chemical reactors, \*Manures, \*Methane, Anaerobic digestion, Biochemical reaction kinetics, Biosynthesis, Design, Fermentation, Maize, Time dependence.  
 Identifiers: ERDA/140504, ERDA/090122, Synthetic fuels, Manufactured gas, Solid waste disposal.

Progress in comparative studies of complete-mix and multi-stage reactors for use in the anaerobic fermentation of organic solids for methane production is reported. Results indicate that if a balanced population of organisms can be maintained in the initial stage, multi-stage fermentation is more efficient than a complete-mix system. However, if the system is stressed, failure of the multi-staged system is more rapid. When the first stage is not inhibited due to a short retention time, the waste stabilization in the additional stages is minimal. Further studies on the effect of retention time on reaction rates indicate that the type of reactor design desired will depend upon the objective of the system. If it is desired to maximize the conversion of solids to methane, a staged system will produce more methane per unit volume of reactor for a given quantity of substrate. If the objective is to maximize methane production per unit volume of reactor, a single-stage reactor operating at near the minimum retention is required. Results of studies on the fermentation of manures and corn stover are discussed briefly. (ERA citation 03:030551)

**COO/2917-76/2** PC A02/MF A01  
 Illinois Univ., Urbana. Dept. of Civil Engineering.  
**Biological Conversion of Biomass to Methane. Quarterly Progress Report, September 1, 1976--November 30, 1976**  
 J. T. Pfeffer. Dec 76, 14p  
 Contract EY-76-S-02-2917

Descriptors: \*Manures, \*Methane, Anaerobic digestion, Biomass, Biosynthesis, Research programs.  
 Identifiers: ERDA/090122, ERDA/140504, Fermentation, \*Solid waste disposal.

During the past quarter all experimental systems have become operational. The earlier problems with equipment acquisition have delayed the progress somewhat. However, most of these problems have been overcome such that the experimental programs have been initiated. This report will concentrate on the manure fermentation portion of this project. The study relating to the effect of reactor design is underway, but the results are too preliminary to evaluate. Therefore, no data from this activity will be reported. (ERA citation 02:035903)

**COO-2929-6** PC A05/MF A01  
 Honeywell, Inc., Minneapolis, Minn. Energy Resources Center.  
**Low-Cost Solar Air Heater. Semi-Annual Progress Report, June 29, 1976--December 22, 1976**  
 D. R. Rask, and L. J. Mueller. 22 Dec 77, 89p  
 Contract EY-76-C-02-2929

Descriptors: \*Solar air heaters, Computer calculations, Cost, Design, Efficiency, Fabrication, Jets, Performance, Performance testing, Simulation, Spectrally selective surfaces.



# APPROPRIATE TECHNOLOGY ABSTRACTS

Identifiers: ERDA/141000, \*Solar collectors, Heat transfer.

The results to date on the development of a low-cost solar air heater are described. A unique jet-impingement concept is used as the absorber plate-to-air stream heat-transfer mechanism. The program objective is to design, fabricate, test and evaluate the jet-impingement concept collector. For comparison purposes, a baseline parallel-plate collector was analyzed, fabricated and tested. Values for the average jet-heat transfer coefficient are predicted and presented. A computer simulation using a nodal network collector model is used to predict collector performance. The predicted efficiency improvement of the jet-plate collector over that of the parallel-plate collector, at a fixed-flow rate of 1.47 kg/min-m<sup>2</sup>(4SCFM/ft exp 2), is approximately 11 percent for a one-cover design and 9 percent for a two-cover design. If the existing selective absorber coating and etched cover glass technology of Honeywell is applied to the jet-plate collector, the resulting performance gain over the baseline parallel-plate collector is 21 percent at the intercept and 35 percent for a typical space heating application. The collector mechanical design effort involved a study of cost effective methods for assembly and material selection. A preliminary recommended design is presented. In summary, it has been recommended that aluminumized steel sheet, pre-painted with an acrylic paint, be used for the box material. A semi-rigid fiber glass, 2.54-cm (1-inch) thick, with an aluminum facing is recommended for the insulation. A steel absorber plate and a pre-assembled nozzle plate or perforated plate is used for the jet plate. Two sheets of 0.318-cm (0.125 inch) tempered, low-iron glass are recommended for the glazings. The baseline parallel plate test results are presented. Since jet-plate collector testing had just commenced at the time of this writing, we have no test results. (ERA citation 03:008225)

**COO-2948-2** PC A15/MF A01  
Woods Hole Oceanographic Institution, MA.  
**Cultivation of Macroscopic Marine Algae and Freshwater Aquatic Weeds. Progress Report, May 1--December 31, 1976**  
J. H. Ryther. Jan 77, 346p  
Contract EY-76-S-02-2948

Descriptors: \*Algae, \*Weeds, Ammonia, Anaerobic digestion, Aquatic organisms, Cultivation techniques, Fermentation, Fresh water, Nutrients, Plant growth, Research programs, Seaweeds, Thermophilic conditions, Yields.  
Identifiers: ERDA/140504, Biomass, \*Synthetic fuels.

Research was divided between basic physiological studies of the growth and nutrient-uptake kinetics of macroscopic marine algae and the more applied problems involved in the selection of species and the development of inexpensive, non-energy intensive culture methods for growing seaweeds and freshwater plants as a biomass source for conversion to energy. Best growth of the seaweeds occurs at low (0.1 to 1.0 mu molar) concentration of major nutrients, with ammonia as a nitrogen source, with rapid exchange of the culture medium (residence time of 0.05 days or less). Of 43 species of seaweeds evaluated, representatives of the large red alga genus *Gracilaria* appear most promising with potential yields, in a highly intensive culture system under optimal conditions, of some 129 metric dry tons per hectare per year (about half of which is organic). Non-intensive culture methods have yielded one-third to one-half that figure. Unexplained periodicity of growth and overgrowth by epiphytes remain the most critical constraint to large-scale seaweed culture. Freshwater weed species in culture include water hyacinth (*Eichhornia crassipes*), duckweed (*Lemna minor*), and *Hydrilla verticillata*, with yields to date averaging 15, 4, and 8 g dry wt/m<sup>2</sup> exp 2 /day, respectively. However, these plants have not yet been grown through the winter, so average annual yields are expected to be lower. In contrast to the seaweeds, the freshwater plants grow well at high nutrient concentrations and slow culture volume exchange rates (residence time ca. 20 days or more). Experiments were initiated on the recycling of digester residues from the fermentation of the freshwater and marine plants as a possible nutrient source for

growth of the same species. (ERA citation 04:005496)

**COO-2952-15** PC A05/MF A01  
United Technologies Corp., Windsor Locks, CT.  
Hamilton Standard Div.  
**Dirt Feedlot Residue Experiments. Quarterly Progress Report, July 1--September 30, 1977**  
M. Turk. Oct 77, 77p  
Contract EY-76-C-02-2952

Descriptors: \*Manures, \*Methane, Anaerobic digestion, Biosynthesis, Cattle, Chemical reactors, Diagrams, Medium temperature, Organic acids, Performance, Research programs, Yields.  
Identifiers: ERDA/140504, Biomass, Synthetic fuels, Solid waste disposal.

Progress is reported in the continued evaluation of baseline performance of the mobile fermentation system utilizing fresh beef steer residue at 0.25 lb. volatile solids/ft exp 3 /day with a ten day residence time and an operating temperature of 57 exp 0 C. Evaluation of the comparative yield from typical aged feedlot pen residue at the same parametric conditions previously used for the baseline study was initiated. Total daily gas production, as well as specific methane yield, indicated a sudden decrease. This decrease, however, stabilized relatively quickly indicating that the material, while having a lower gaseous yield, was not grossly toxic. The 10 day running average of specific methane yield, which acts as a smoothing function for the somewhat more erratic daily yields, indicates a yield of 2.5 ft exp 3 CH sub 4 /pound volatile solids. This represents 60% of that obtained from the fresh residue and is most encouraging. During this period of time the concentration of Total Volatile Acid was allowed to rise. That is, no attempts at control (e.g., iron chloride) were made in order to learn what equilibrium value would result. By the end of the reporting period, the TVA concentration was approximately 4000 to 5000 mg/l. (ERA citation 04:005497)

**COO-2952-17** PC A03/MF A01  
United Technologies Corp., Windsor Locks, CT.  
Hamilton Standard Div.  
**Monfort Dirt Lot Experiments. Status Report**  
31 Mar 78, 33p  
Contract EY-76-C-02-2952

Descriptors: \*Manures, \*Methane, Anaerobic digestion, Biosynthesis, Cattle, Chemical reaction kinetics, Chemical reactors, Diagrams, Drugs, Fermentation, Food, Gas yields, Images, Liquids, Nutrients, Proteins, Stability.  
Identifiers: ERDA/140504, ERDA/090122, Fuel gas, Biomass, Synthetic fuels, Solid waste disposal.

A mobile processing unit is being used to investigate the feasibility of producing fuel gas and an energy-intensive refeed product from dirt feedlot residues by anaerobic fermentation. Results to date have shown that: a stable fermentation can be achieved utilizing aged feedlot pen residue if a sufficient adaptation period is provided. Methane yields of 2.75 ft exp 3 /pound volatile solids fed can be attained at a loading rate of 0.25 pounds volatile solids/ft exp 3, 10 day retention time and thermophilic temperature of 57 exp 0 C. The fermentor liquid effluent is acceptable to cattle as a feed ingredient and was used to provide one-half the daily supplemental protein for twenty steers. Residual pharmaceuticals and low levels of heavy metals as well as various anions and cations may possibly impose some additional stress upon the system but do not present a significant detriment to successful operation. Feedlot residue is highly variable in both dry matter and inert content with typical particle size in the micron range. (ERA citation 04:005498)

**COO-2981-7** PC A03/MF A01  
New York State Coll. of Agriculture and Life Sciences, Ithaca.  
**Anaerobic Fermentation of Agricultural Residues: Potential for Improvement and Implementation. Seventh Quarter Progress Report, December 16, 1977--March 15, 1978**  
W. J. Jewell, R. W. Guest, R. C. Loehr, D. R. Price, and W. W. Gunkel. 1978, 34p

Contract EY-76-S-02-2981

Descriptors: \*Manures, \*Methane, \*Anaerobic digestion, Biosynthesis, Chemical reactors, Construction, Research programs, Temperature effects.  
Identifiers: ERDA/090122, ERDA/140504, Manufactured gas, Synthetic fuels, Solid waste disposal, Fermentation, \*Agricultural wastes.

This is the seventh progress report of an on-going three year research effort to contribute to the development of a new and/or improved technology that will result in wide spread use of an anaerobic fermentation in agriculture to generate a renewable clean energy source. Activities are now concentrating on full-scale and pilot-scale demonstration of simplified fermentors for manures. Activities for the seventh quarter year, extending from December 16, 1977 to March 15, 1978, have included the following: completion of construction of the full scale conventional control fermenter; completion of construction, testing and startup of the random mix fermenter; installation of feed and effluent lines, electrical wiring, boilers, gas lines and controls; successful testing of the ram pump; conclusion of the 35 exp 0 C studies with the pilot scale plug flow fermenter and the initiation of the low temperature (25 exp 0 C) studies; and preparation of a detailed outline to the design manual. As of March 15, 1978, the overall progress achieved with the major components of the project was estimated to be about 2.5 months behind the work plan schedule. As detailed in the last progress report, much of this delay has been due to the winter weather (i.e., cold temperatures, snow, frozen ground, etc.) which has interfered with excavation and other outdoor construction activities. (ERA citation 04:005416)

**COO/2991-10** PC A10/MF A01  
Dynatech R/D Co., Cambridge, Mass.  
**Fuel Gas Production from Animal Residue. Dynatech Report No. 1551**  
E. Ashare, D. L. Wise, and R. L. Wentworth. 14 Jan 77, 210p  
Contract EY-76-C-02-2991

Descriptors: \*Anaerobic digestion, \*Fuel gas, \*Manures, Biosynthesis, Cattle, Chemical reaction kinetics, Computer codes, Computers, Design, Diagrams, Economics, Energy balance, Equipment, Material balance, Materials handling, Mathematical models, Methane, Net energy, Optimization, Production, Sewage, Tables.  
Identifiers: ERDA/140504, ERDA/090122, Synthetic fuels, Manufactured gas, Solid wastes.

A comprehensive mathematical model description of anaerobic digestion of animal residues was developed, taking into account material and energy balances, kinetics, and economics of the process. The model has the flexibility to be applicable to residues from any size or type of animal husbandry operation. A computer program was written for this model and includes a routine for optimization to minimum unit gas cost, with the optimization variables being digester temperature, retention time, and influent volatile solids concentration. The computer program was used to determine the optimum base-line process conditions and economics for fuel gas production via anaerobic digestion of residues from a 10,000 head environmental beef feedlot. This feedlot at the conditions for minimum unit gas cost will produce 300 MCF/day of methane at a cost of \$5.17/MCF (CH sub 4), with a total capital requirement of \$1,165,000, a total capital investment of \$694,000, and an annual average net operating cost of \$370,000. The major contributions to this unit gas cost are due to labor (37 percent), raw manure (11 percent), power for gas compression (10 percent), and digester cost (13 percent). A conceptual design of an anaerobic digestion process for the baseline conditions is presented. A sensitivity analysis of the unit gas cost to changes in the major contributions to unit gas cost was performed, and the results of this analysis indicate areas in the anaerobic digestion system design where reasonable improvements could be expected so as to produce gas at an economically feasible cost. This sensitivity analysis includes the effects on unit gas cost of feedlot size and type, digester type, digester operating conditions, and economic input data. (ERA citation 03:011895)



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**COO/2991-11** PC A03/MF A01  
Dynatech R/D Co., Cambridge, Mass.  
**Fuel Gas Production from Animal Waste. Report of Quarterly Review Meeting, Palo Alto, California, December 13--14, 1976. Dynatech Report No. 1573**  
E. Ashare, R. L. Wentworth, and D. L. Wise. 1  
Feb 77, 50p  
Contract EY-76-C-02-2991

Descriptors: \*Agricultural wastes, \*Biomass, \*Manures, \*Methane, Anaerobic digestion, Biosynthesis, Diagrams, Fermentation, Planning, Research programs, Bioconversion, Solid wastes, Synthesis, Waste management, Waste processing.  
Identifiers: ERDA/140504, ERDA/090122, Manufactured gas, Synthetic fuels.

A quarterly review coordination meeting was held with all the contractors on the ERDA fuel gas from animal waste program. Included in this report are a meeting schedule and reports from the various contractors giving a description of their work during the reporting period. Progress in the following studies is reported: Monfort waste conversion demonstration; engineering report on fuel gas production from animal residue; biological conversion of biomass to methane; anaerobic fermentation of animal and crop residues; heat treatment of organics for increasing anaerobic biodegradability; and anaerobic fermentation of agricultural wastes--potential for improvement and implementation. (ERA citation 03:017179)

**COO/2991-19** PC A07/MF A01  
Dynatech R/D Co., Cambridge, Mass.  
**Anaerobic Digestion Technology. Quarterly Progress Meeting, Ithaca, New York, June 20--22, 1977**  
Nov 77, 136p  
Contract EY-76-C-02-2991

Descriptors: \*Anaerobic digestion, Leading abstract, Research programs.  
Identifiers: ERDA/140504, ERDA/090122.

Summaries of the current status of research on anaerobic digestion technology are presented. The fourteen projects reported on range in subject matter from the fundamentals and mechanisms of anaerobic digestion to the construction and operation of demonstration plants. Separate abstracts were prepared for each summary of research progress. (ERA citation 03:026005)

**COO-2991-28** PC A08/MF A01  
Dynatech R/D Co., Cambridge, MA.  
**Fuel Gas Production from Animal and Agricultural Residues and Biomass. Seventh Quarterly Coordination Meeting, Seattle, Washington, January 9--10, 1978**  
D. L. Wise, and R. L. Wentworth. 27 Jan 78, 156p  
Contract EY-76-C-02-2991

Descriptors: \*Agricultural wastes, \*Manures, \*Methane, Anaerobic digestion, Biosynthesis, Research programs.  
Identifiers: ERDA/090122, ERDA/140504, Biomass, Synthetic fuels, Manufactured gas, \*Meetings, \*Solid waste disposal.

A regular coordination meeting, the seventh in a quarterly series, was held of the "methane production" group of the Fuels from Biomass Systems Branch, U.S. Department of Energy. The meeting was held in Seattle, Washington in order to site visit the Monroe, Washington anaerobic digester facility operated by Ecotope Group, Inc. In addition, progress reports were presented from all contractors. A list of attendees, the working schedule, and the progress reports and special topical reports presented are included in the following. Separate abstracts were prepared for the progress and special topical reports. (ERA citation 04:005417)

**COO/2991-76/4** PC A02/MF A01  
Dynatech R/D Co., Cambridge, Mass.

**Fuel Gas Production from Animal Waste. Phase I. Quarterly Progress Report (1ST), May 17, 1976--September 1, 1976. Dynatech Report No. 1519**  
E. Ashare, R. L. Wentworth, D. L. Wise, D. C. Augenstein, and L. C. Anderson. 17 Sep 76, 13p  
Contract EY-76-C-02-2991

Descriptors: \*Manures, \*Methane, Anaerobic digestion, Biosynthesis, Chemical reaction kinetics, Equations, Fermentation, Fuel gas, Material balance, Planning, Research programs.  
Identifiers: ERDA/140504, ERDA/090122, \*Synthetic fuels, \*Manufactured gas.

Meetings held with all contractors on the ERDA fuel gas from animal waste program are listed. These meetings were held for project planning, project review, and contractor site visits. Engineering analysis of the anaerobic digestion process for the demonstration plant is being carried out. Expressions for material balances have been developed. Several proposals were received from ERDA and reviewed. (ERA citation 03:008191)

**COO/2991-8** PC A02/MF A01  
Dynatech R/D Co., Cambridge, Mass.  
**Fuel Gas Production from Animal Waste: Phase I. Quarterly Progress Report (2nd), September 1, 1976--December 1, 1976. Dynatech Report No. 1556**  
E. Ashare, R. L. Wentworth, D. L. Wise, and D. C. Augenstein. 8 Dec 76, 10p  
Contract EY-76-C-02-2991

Descriptors: \*Fuel gas, \*Manures, Anaerobic digestion, Biosynthesis, Research programs.  
Identifiers: ERDA/140504, ERDA/090122, Synthetic fuels, Manufactured gas, Solid wastes.

During this second quarter, meetings were held with contractors on the ERDA Fuel Gas from Animal Waste Program to discuss project planning and review. Site visits were made to groups involved in anaerobic digestion. An engineering and economic analysis of a process for the anaerobic digestion of animal residue was completed; the results can be used for the design of a pilot plant unit. A comprehensive engineering report of this analysis was completed, and a first draft was submitted to ERDA. Several proposals were received from ERDA and reviewed. (ERA citation 03:011894)

**COO-4094-1** PC A05/MF A01  
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.  
**Photovoltaic Power in Less Developed Countries**  
D. V. Smith. 24 Mar 77, 92p  
Contract EY-76-C-02-4094

Descriptors: \*Developing countries, \*Irrigation, \*Photovoltaic power plants, \*Solar cell arrays, \*Solar water pumps, Communities, Demonstration programs, Diesel engines, Drinking water, Economics, Electric power, Feasibility studies, Lighting systems, Photovoltaic conversion, Pumps, Rural populations, Solar cells, Television.  
Identifiers: ERDA/140501, ERDA/140600, ERDA/140300, ERDA/299001.

The potential of solar photovoltaic power in the third world (less developed countries) is analyzed. Application of irrigation systems powered by photovoltaics in Bangladesh, Chad, India, and Pakistan, plus an economic analysis of a photovoltaic-powered village in northern India indicate solar energy is competitive with the least-cost fossil-fuel alternatives. The most cost-effective method for specific geographical locations can be determined by field testing based on the case history data reported. (ERA citation 02:045245)

**COO-4147-3** PC A03/MF A01  
General Electric Co., Schenectady, NY. Research and Development Center.  
**Bioconversion of Plant Biomass to Ethanol. Third Quarterly and Bimonthly Report, July 1--September 30, 1977**  
R. E. Brooks, W. D. Bellamy, and T. M. Su. Oct 77, 36p  
Contract EG-77-C-02-4147

Descriptors: \*Cellulose, \*Ethanol, \*Wood, Bioconversion, Biosynthesis, Calcium carbonates, Delignification, Enzymatic hydrolysis, Fungi, Ph value, Research programs, Thermophilic conditions.  
Identifiers: ERDA/090222, ERDA/140504, Biomass, Solid wastes.

The studies of biological delignification have focused on the adaptation of the lignocellulosic thermophilic mold *Chrysosporium pruinosum* to growth on maple wood fibers. The addition of trace elements and thiamine hydrochloride to the *C. pruinosum* growth medium has been found to stimulate culture growth by a factor of about two. The nutritional salt tolerances of *C. pruinosum* have been determined. Nutrient concentrations below of about 2.5 times that required to support *C. pruinosum* growth have no significant deleterious inhibitory effects. Work on the design and construction of a bench-top high solids biological delignification bioreactor has been initiated. The mixed culture microbiological studies have focused mainly on nutritional growth requirements and rates of cellulose digestion and ethanol production. In small test tube mixed culture (*sporocytophaga* (US) + thermophilic bacillus (NW)) fermentations, the rate of cellulose degradation was found to proceed at a very high volumetric efficiency, 2.4 g/l-hr. The yield of ethanol from the mixed culture fermentation of cellulose varied between 24 and 50% of theoretical. The higher yields were obtained in the presence of insoluble calcium carbonate added to retard the rate of pH decline and to increase the CO sub 2 tension. Bench-top fermentations at the 1 liter scale have been performed to verify, under controlled pH, agitation, and dissolved oxygen conditions, the results achieved in small scale test tube experiments. The specific growth rate of thermophilic bacillus NW on glucose was calculated to be 0.59 hr exp -1. In mixed culture fermentations of amorphous and microcrystalline cellulose the specific rate of substrate depletion was calculated to be 0.087 hr exp -1 and 0.0346 hr exp -1, respectively. Ethanol production in these fermentor runs was slower than the rates of acetic acid production. In the fermentation of microcrystalline cellulose, 2,3 butanediol was also produced. (ERA citation 03:054807)

**COO-4147-4** PC A07/MF A01  
General Electric Co., Schenectady, NY.  
**Bioconversion of Plant Biomass to Ethanol. Annual Report and Revised Research Plan, January 1977--January 1978**  
R. E. Brooks, W. D. Bellamy, and T. M. Su. 23 Mar 78, 147p  
Contract EG-77-C-02-4147

Descriptors: \*Ethanol, \*Wood, \*Xylose, Biodegradation, Biosynthesis, Cellulose, Clostridium, Delignification, Enzymatic hydrolysis, Fermentation, Fungi, Hemicellulose, Processing, Steam, Thermophilic conditions.  
Identifiers: ERDA/090222, ERDA/140504, Biomass, Synthetic fuels, Manufactured gas.

The objective of this research is to demonstrate on a laboratory scale the technical feasibility of the direct microbial conversion of pretreated wood to ethanol. During the first year of this contract, we investigated the feasibility of biologically delignifying wood with *C. pruinosum* and directly fermenting the pretreated wood to ethanol with a mixed culture. Bench-top fermentations of a thermophilic bacillus growing on glucose and of a mixed culture of thermophilic *sporocytophaga* (US) and a thermophilic bacillus growing on microcrystalline and amorphous cellulose were evaluated for growth and ethanol production. In the mixed culture fermentation of amorphous and microcrystalline cellulose, the specific rate of substrate depletion was calculated to be 0.087 hr exp -1 and 0.0346 hr exp -1, respectively. However, defining the growth requirements of *C. pruinosum* and *sporocytophaga* (US) proved more difficult than originally anticipated. In order to achieve the program objectives within the contract period, a revised research plan was developed based upon chemical pretreatment and the direct fermentation of pretreated hardwood to ethanol. In place of the biological delignification pretreatment step, we have substituted a chemically supplemented steam pretreatment step to partially delignify wood and to enhance its accessibility to microbial utilization. *Clostridium thermocellum*, which ferments cellulose directly to



ethanol and acetic acid, has replaced the mixed culture fermentation stage for ethanol production. Research on the production of ethanol from xylose by the thermophilic bacillus ZB-B2 is retained as one means of utilizing the hemicellulose fraction of hardwood. Work on the genetic improvement of the ethanol yields of both cultures by suppressing acetic acid production is also retained. The rationale, experimental approach, and economic considerations of this revised research plan are also presented. (ERA citation 04:002695)

**COO-4151-2** PC A06/MF A01  
Woods Hole Oceanographic Institution, MA.  
**Fuels from Solar Energy: Photosynthetic Systems--State of the Art and Potential for Energy Production**  
J. C. Goldman. Jul 78, 124p  
Contract EG-77-S-02-4151

Descriptors: \*Unicellular algae, Aquaculture, Cultivation techniques, Photosynthesis, Ponds, Productivity, Reviews, Single cell protein, Solar energy conversion.  
Identifiers: ERDA/140504, State of the art, Biomass, Biological industrial waste treatment, Life support systems, Chemical feedstocks, Synthetic fuels, Forecasting.

Research on the mass culturing of microalgae has been carried out over the past 30 years in many parts of the world. Today there are numerous potential applications for algal mass cultures including protein production, wastewater treatment, water renovation, closed life-support systems, production of commercial chemicals, aquaculture, and bioconversion of energy. Photosynthetic yields over 30 gr dry wt m exp -2 day exp -1 have been attained on occasion in many locations for short periods and yields between 15 to 25 gr dry wt m exp -2 day exp -1 for longer periods are now common. This apparent upper limit in productivity is not coincidental. Under outdoor conditions peak yields are possible only under conditions of light limitation. Photosynthetic algae absorb light energy and convert it to stored chemical energy under rigid adherence to the laws of thermodynamics. By examining the basic physics of photosynthesis, it is possible to clearly demonstrate that under conditions of full sunlight in the most ideal locations maximum yields of 30 to 40 gr m exp -2 day exp -1 can be expected. For long-term operation of large-scale outdoor cultures, many bioengineering factors are involved and realistic yields considerably less than the maximum potential can be anticipated. Manipulation of the two independent variables, flow rate and depth, is the key to maximizing yields for varying outdoor sunlight intensities. Future applications for algal mass cultures will probably be restricted to small well-managed systems for solving specific environmental problems in individual communities and not on the grand scale envisaged in the past. (ERA citation 04:025921)

**COO-4225-1** PC A10/MF A01  
Illinois Univ., Urbana. Office of Energy Research.  
**Fuels from Biomass Symposium**  
J. T. Pfeffer, and J. J. Stukel. 1977, 220p Rept no. CONF-770481-  
Contract EG-77-C-02-4225  
Fuels from biomass symposium, Champaign, IL, USA, 18 Apr 1977.

Descriptors: \*Bioconversion, \*Biomass, \*Meetings, Combustion, Growth, Thermochemical processes.  
Identifiers: ERDA/140504, ERDA/090122, ERDA/090222, \*Fuels, Synthetic fuels, Manufactured gas.

The thirteen papers presented are compiled. Each was individually prepared for inclusion into the EDB data base. (ERA citation 04:007684)

**DIB-76-02-503** PC E06/MF A01  
P. A. Management Consultants (Pte) Ltd., Singapore.  
**Survey of the Market for Sawmilling and Woodworking Equipment in Singapore**  
Foreign market survey rept.  
18 Jul 75, 112p

Sponsored in part by Domestic and International Business Administration, Washington, D.C.

Descriptors: \*Market surveys, \*Woodworking machinery, \*Sawmills, \*Singapore, Molding machines, Planers, Drilling machines(Tools), Materials handling equipment, Exports, International trade, Market research, United States.  
Identifiers: SIC 3423, SIC 3537, SIC 3567, SIC 3811, SIC 3546, SIC 3425, SIC 3535, SIC 9770.

There are important markets in Singapore for several of the product categories under reference e.g., woodworking items. However, the total sawmilling and woodworking industry is not buoyant and in fact, certain sectors (e.g. sawmilling) are quite stagnant. Growth trends for the foreseeable future would therefore not be significant. Currently, awareness of the U.S. range of products is poor. Most respondents had no prior experience with U.S. equipment. Several misconceptions were evident; for example, it was felt that: U.S. equipment is highly priced or even over-priced; U.S. equipment, because of its high level of sophistication, is often not relevant to local operating requirements. Sales potential for the immediate future is generally poor. Of the total range of items under review, respondents indicated that the items more likely to be purchased within the next two years would probably include portable sawmills, molders, planing machines, drilling machines, and materials handling equipment.

**DIB-77-10-514** PC E06/MF A01  
Chinca Credit Information Service Ltd., Taipei (Taiwan). Marketing Research Dept.  
**Plywood Processing and Woodworking Equipment Study in Taiwan R. O. C**  
Foreign market survey rept.  
Jun 77, 70p Rept no. Job-770355

Descriptors: \*Market surveys, \*Woodworking machinery, \*Plywood, \*Taiwan, Exports, Market research, United States.  
Identifiers: SIC 3553, SIC 9770, \*Foreign trade.

The market research was undertaken to study the present and potential US share of the market in Taiwan for plywood processing and woodworking equipment; to examine growth trends in the Taiwan end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques were also reviewed.

**DOE/AD-0006/1** PC A09/MF A01  
Department of Energy, Washington, D.C.  
**DOE Facilities Solar Design Handbook**  
Jan 78, 177p  
Contract W-7405-ENG-36

Descriptors: \*Buildings, \*Commercial buildings, \*Solar cooling systems, \*Solar heating systems, \*Manuals, Climates, Control systems, Data, Design, Economics, Heat storage, Heat transfer, Insolation, Regional analysis, Size, Solar air conditioners, Solar air conditioning, Solar collectors, Solar space heating, Solar-assisted heat pumps, Thermal insulation, US DOE, Weather.  
Identifiers: ERDA/140901, ERDA/140907, ERDA/299001, Handbooks.

This handbook covers design of solar heating systems for commercial and laboratory buildings at Department of Energy Facilities. It includes discussions of solar energy fundamentals, solar heating and cooling technology, systems, and components, as well as a discussion of solar system economics. Quantitative analysis, with generalized design and sizing curves, is presented for solar heating so that collector and other system parameters can be cost-economically sized without a computer simulation. Solar system design considerations and guidelines, as well as guidelines for developing subsystem specifications, are presented. Thus this handbook is both a primer for the solar novice and a reference manual for the solar system designer. (ERA citation 03:030607)

**DOE/CS-0038** PC A06/MF A01  
Department of Energy, Washington, DC. Div. of Solar Applications Developments.  
**National Solar Heating and Cooling Commercial Demonstration Program: Key Personnel Directory**  
Jun 78, 121p

Descriptors: \*Commercial buildings, \*Demonstration programs, \*Residential buildings, \*Solar air conditioning, \*Solar space heating, \*Directories, Personnel.  
Identifiers: ERDA/140901, ERDA/299001.

Firms and individuals who are principal participants in the DOE solar heating and cooling demonstration projects for Federal and non-Federal commercial buildings and Federal residential buildings are identified. The directory is intended to facilitate communication with, and among, active participants in demonstrations of solar heating and cooling technology currently sponsored by DOE. When available, identifying information has been provided for owners, architects, solar designers, mechanical engineers, builders, and other key personnel directly involved in each project. (ERA citation 04:005562)

**DOE/CS-0038-2** PC A14/MF A01  
Department of Energy, Washington, DC. Div. of Solar Applications Developments.  
**Solar Heating and Cooling Demonstration Project Summaries**  
Jan 79, 319p

Descriptors: \*Solar air conditioning, \*Solar space heating, Commercial buildings, Demonstration programs, Economics, Federal buildings, Maps, Performance, Residential buildings, Reviews, US DOE.  
Identifiers: ERDA/140901, ERDA/299001.

The demonstration program includes commercial and residential-type buildings sponsored by DOE alone, or jointly with other Federal agencies, city and state governments, and private agencies. The commercial projects include a wide variety of building types, such as: office buildings, schools, fire stations, civic centers, factories, and libraries. Residential projects include both single and multi-family dwellings of various configurations. Approximately 200 projects will be instrumented to measure the performance of the solar systems. Analysis of the collected data will provide definitive guides for design criteria and permit realistic economic assessment of various solar systems. The demonstrations are discussed in three sections: section I--Commercial Demonstration Program--Non-Federal Buildings; section II--Commercial Demonstration Program--Federal Buildings; and section III--Residential Demonstration Program--Federal Buildings. Maps showing the locations (by state) of the buildings are provided at the beginning of each section along with an index that identifies each project and page number for the corresponding descriptive information. A map depicting the distribution of all demonstration projects is included in this introduction. The comparable map from last year's publication is also shown to depict the increase in the number of projects. The contents of this document are based on information available as of November 1, 1978. (ERA citation 04:032966)

**DOE/ET-0036** PC A04/MF A01  
Department of Energy, Washington, D.C. Div. of Solar Technology.  
**Guide to Solar Energy Programs**  
Mar 78, 72p

Descriptors: \*Solar energy, US DOE, Environmental impacts, Government policies, Information, Information centers, Procurement, Research programs, Technology transfer.  
Identifiers: ERDA/140000, ERDA/299001.

The mission and objectives of the U.S. Department of Energy (DOE) are outlined. An overview of DOE's solar energy programs is given, including (1) the solar thermal power systems program, (2) the photovoltaic systems program, (3) the fuels from biomass program, (4) the ocean thermal systems program, and (5) the wind energy systems program. Also, the environmental and resource assessment program and the satellite power system



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program are described. Solar energy programs now functioning under the Division of Conservation and Solar Applications are described, including the solar technology transfer program and the thermal applications program. Methods of procurement and guides for proposal preparation and sources of solar energy information and activities supporting the solar energy program are discussed. (ERA citation 03:032878)

**DOE/ET-0036/1** PC A04/MF A01  
Department of Energy, Washington, DC. Div. of Solar Technology.  
**Guide to Solar Energy Programs**  
Jun 78, 75p

Descriptors: \*US DOE, \*Research programs, Bio-conversion, Demonstration programs, Energy source development, Environmental impacts, Ocean thermal energy conversion, Organizational models, Photovoltaic power plants, Solar energy, Solar thermal power plants, Wind power plants.  
Identifiers: ERDA/140000, \*Solar energy, Research projects.

The following are included: Department of Energy mission and objectives, overview of the Department of Energy's solar energy programs, program activities and structure, solar energy programs now functioning under the Division of Conservation and Solar Applications, methods of procurement and guides for proposal preparation, and sources of solar energy information and activities supporting the solar energy program. Included in appendices are: Energy Research Abstracts collections, documents available from National Solar Heating and Cooling Information Center, documents available from DOE Technical Information Center and U.S. Government Printing Office, a ready guide to solar information sources, and a glossary of solar energy terms. The program structure is divided into Solar Thermal Power Systems Program, Photovoltaic Systems Program, Fuels from Biomass Program, Ocean Thermal Systems Program, Wind Energy Systems Program, the Environmental and Resource Assessment Program, Satellite Power System Program, and major projects. (ERA citation 04:021952)

**DOE/NASA/1022-78/29** PC A02/MF A01  
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.  
**Photovoltaic Water Pumping Applications: Assessment of the Near-Term Market**  
L. Rosenblum, W. J. Bifano, L. R. Scudder, W. A. Poley, and J. P. Cusick. Mar 78, 25p Rept no. NASA-TM-78847  
Contract EX-76-A-29-1022

Descriptors: \*Photovoltaic power plants, \*Solar water pumps, \*Solar cell arrays, Commercialization, Developing countries, Evaluation, Market.  
Identifiers: ERDA/140600, ERDA/299001, ERDA/140501, Marketing.

A preliminary assessment of the near-term market for photovoltaic water pumping applications is presented. One of the objectives of the Department of Energy's (DOE) National Photovoltaic Program is to stimulate the demand for photovoltaic power systems so that appropriate markets will be developed in the near-term to support the increasing photovoltaic production capacity also being developed by DOE. Water pumping applications represent such a potential market for photovoltaics. The price of energy for photovoltaic systems is compared to that of utility line extensions and diesel generators. The potential "domestic" demand is defined in the government, commercial/institutional and public sectors. The foreign demand and sources of funding for water pumping systems in the developing countries are also discussed briefly. It is concluded that a near-term domestic market of at least 240 megawatts (peak) and a foreign market of about 6 gigawatts (peak) exists and that significant market penetrations should be possible beginning in the 1981-82 period. (ERA citation 03:032896)

**DOE/NASA/1022-78/39** PC A02/MF A01  
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.

**Design and Fabrication of a Photovoltaic Power System for the Papago Indian Village of Schuchuli (Gunsight), Arizona**  
W. J. Bifano, A. F. Ratajczak, and W. J. Ice. 1978, 10p Rept nos. CONF-780619-12, NASA-TM-78948  
Contract EY-76-A-29-1022  
IEEE photovoltaic specialists conference, Washington, DC, USA, 5 Jun 1978.

Descriptors: \*Communities, \*Photovoltaic power plants, Appliances, Arizona, Clothes washers, Design, Direct current, Electric batteries, Lighting systems, Overhead power transmission, Power range 1-10 kw, Pumps, Refrigerators, Remote areas, Size, Solar cell arrays.  
Identifiers: ERDA/140600, ERDA/140501, \*Solar cells, Solar energy conversion, Photovoltaic conversion, Schuchuli(Arizona).

In its role of supporting the DOE National Photovoltaic Program, the NASA-LeRC is designing and fabricating a stand-alone photovoltaic power system for installation in the Papago Indian village of Schuchuli, located approximately 120 miles west of Tucson, AZ. This village presently has no electrical power. The photovoltaic system is being designed to provide electricity for village water pumping and basic domestic needs as part of a cost-shared experiment involving LeRC, the U.S. Public Health Service and the Papago Tribe of Arizona. The system will consist of a 3.5 kW (peak) photovoltaic array; controls, instrumentation, and storage batteries located in an electrical equipment building; and a 120 volt DC village distribution network. The photovoltaic system will power a 2 HP DC electric motor (replacing an existing diesel engine) for water pumping; 15 refrigeration units, a washing machine and a sewing machine in a domestic services building; and fluorescent lights in the feast house, church and each of the 15 homes in the village. (ERA citation 03:052253)

**DOE/NASA/1022-78/41** PC A02/MF A01  
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.  
**Utilization of Solar Energy in Developing Countries: Identifying Some Potential Markets**  
G. F. Hein, and T. A. Siddiqui. 1978, 13p Rept no. NASA-TM-78964  
Contract EX-76-A-29-1022

Descriptors: \*Developing countries, \*Photovoltaic power plants, \*Solar cell arrays, Cost, Data, Economic analysis, Energy consumption, Insolation, Market, Technology assessment.  
Identifiers: ERDA/140600, ERDA/140501, ERDA/299001, ERDA/290200, Solar power plants.

The potential use of solar electricity generated from photovoltaic cells is examined for nineteen developing nations. Energy and economic profiles are summarized for each country. A comparison is made between the use of autogeneration and photovoltaics in a rural area of Haiti. (ERA citation 04:002836)

**DOE/NASA/1028-77/13** PC A03/MF A01  
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.  
**Wind Turbine Generator Rotor Blade Concepts with Low Cost Potential**  
T. L. Sullivan, T. P. Cahill, D. G. Griffie, Jr, and H. W. Gewehr. Dec 77, 40p Rept nos. CONF-780502-1, NASA-TM-73835  
Contract EX-76-A-29-1028  
23. national SAMPE symposium, Anaheim, CA, USA, 2 May 1978.

Descriptors: \*Turbine blades, \*Wind turbines, Cost, Fabrication, Feasibility studies, Performance, Stresses.  
Identifiers: ERDA/170602, \*Rotor blades(Turbo machinery).

Four processes for producing blades are examined. Two use filament winding techniques and two involve filling a mold or form to produce all or part of a blade. The processes are described and a comparison is made of costs, material properties, designs and free vibration characteristics. Conclusions are made regarding the feasibility of each process to produce low cost, structurally adequate blades. (ERA citation 03:028112)

**ED-060 874** Not available NTIS  
World Health Organization, Djakarta (Indonesia). Regional Office for South-East Asia.  
**Assignment Report on Library Banks in Health Institution in Indonesia**  
Takeo Urata. 1971, 34p Rept no. Indonesia-0115/E  
Available from ERIC Document Reproduction Service, Bethesda, Md. 20014 PC\$3.29, MF\$0.65.

Descriptors: \*Medical libraries, \*Foreign countries, \*Library survey, \*Information networks, \*Library networks, Information needs, \*National programs, Developing nations, \*Library collections, Library services, \*Librarians, Library technicians.  
Identifiers: \*Indonesia.

The medical library needs of Indonesia were surveyed and recommendations for improving the existing situation are made based on the results of the survey. The survey indicates that: (1) the library collections are out of date and inadequate, (2) there is a need for more and better trained medical librarians and library assistants; (3) there is no modern circulation system for charging out books, (4) generally there is no good coordinated library service between the medical schools and the teaching hospitals and (5) many of the institutions surveyed have no library facilities at all. It is recommended that a Library Development Committee be appointed under the Ministry of Health and that this committee start working out a Master Plan at once. It is further recommended that two library administrators be sent abroad to see: (1) how the modern medical library is organized and managed, (2) how the modern medical library is used for education, research and clinics and (3) how library technology is developing to meet the daily needs. It is highly recommended that the publication and library routine work be mechanized. (Author/NH)

**ED-061 963** Not available NTIS  
Institute of Teachers' Training and Educational Sciences, Bandung (Indonesia). Bureau of Library.  
**The Education and Training of Indonesian Librarians: Problems and Prospects**  
Soejono Trimio. Jul 70, 18p  
Available from ERIC Document Reproduction Service, Bethesda, Md. 20014 PC\$3.29, MF\$0.65.

Descriptors: \*Librarians, \*Training, \*Library education, Conference reports, \*Public libraries, \*Foreign countries, \*Library schools, Developing nations, \*Library technicians, Training, \*Libraries, Foreign countries.  
Identifiers: \*Indonesia.

The education and training of Indonesian librarians is presented in the context of the Indonesian society; specifically, the relation with the educational aspects and programs of the nation. Only after these aspects are understood can well-balanced educational programs for the training of librarians be set up. It is shown that while there are demands for trained library personnel and professional librarians to support and enhance the national educational programs, the librarians' training centers are inadequate to meet those demands. Steps which could be taken to help solve these problems are suggested. (Author/NH)

**ED-070 505** Not available NTIS  
Tanganyika Library Service (Tanzania).  
**A National Plan for the Development of Library Services**  
Ezekiel E. Kaungamno. Sep 72, 25p  
Available from ERIC Document Reproduction Service, Bethesda, Md. 20014, PC\$3.29, MF\$0.65.

Descriptors: \*Library services, \*Developing Nations, \*African culture, Foreign countries, \*Library planning, Library services, \*Books, Publishing industry, \*Public libraries, Branch libraries, \*Special libraries, School libraries, \*Library cooperation, Library planning, \*Librarians, Training, \*Library technicians, Training.  
Identifiers: Tanganyika, ERICL.

The five essential features of any good library plan are objectives, inputs, process, outputs, and evaluation. In developing countries, the following factors affect, and should be considered in the formulation of library plans: illiteracy, lack of educational facilities, no common language, insufficient funds, and



geographical features and the population distribution. The library services of Tanganyika are discussed, with these features and factors in mind, under the following headings: urban, rural and postal library service; box (collections of books) exchange; school libraries; special library development; Library Services Board Committees (including staff and training, and committees for public, school, special and branch libraries); the Development Programme; cooperation and coordination; manpower planning; recruitment and training of librarians and library assistants; and, the problems of book production. (Other documents on libraries in Tanganyika are available as: ED-053 749, ED-054 829 and ED-054 831.) (SJ)

**ED-073 814** Not available NTIS  
**West Asian Special Libraries and Information Centers**

John F. Harvey. 26 Mar 71, 27p  
Available from ERIC Document Reproduction Service, Bethesda, Md. 20014, PC\$3.29, MF\$0.65.

Descriptors: \*Library science, Foreign countries, \*Special libraries, \*Information center, \*Library services, Information services, \*Developing nations, Foreign countries.  
Identifiers: Iran, \*West Asia, ERICL.

Special libraries are defined in this paper as those libraries serving such institutions as government offices, private corporations, associations, and university departments. Information centers are similar to special libraries but provide personalized, high quality reference service, usually in science and technology, and often using mechanical or electronic methods for document code storage and retrieval. West Asia is that essentially moslem area bound by the United Arab Republic and Turkey on the West and West Pakistan on the East, reaching the border of the USSR on the North and the Arabian Sea on the South. It contains about twenty countries, depending on how the Gulf and Trucial States are counted, and two hundred million people, in an area of 3,500 by 2,000 miles. The USSR, India, Sudan, Libya, and Morocco are omitted from this area as being relatively separate from it in culture, orientation, or geography. While only a guess, it may be estimated that the area as a whole contains between 15,000 and 20,000 libraries of all kinds, of which perhaps 1,500 are special libraries or technical information centers. The majority of the grand total are very small school libraries with public libraries counting the second highest number. On the other hand, most of the better ones are either academic or special libraries. This survey is presented on a country by country basis. Fifteen of the countries were visited personally. (LI 004244 through 004261 and LI 004263 through 004267 are related.) (Author/NH)

**ED-073 815** Not available NTIS  
**Locating West and South Asian Research Material**

John F. Harvey. 5 Dec 70, 16p  
Available from ERIC Document Reproduction Service, Bethesda, Md. 20014, PC\$3.29, MF\$0.65.

Descriptors: \*Library science, Foreign countries, \*Librarians, \*Developing nations, \*Research needs, Library materials, \*Libraries, Use studies.  
Identifiers: Iran, West Asia, South Asia, ERICL.

Although numerous outstanding research collections as well as able professional librarians exist in South and West Asia, many people find Asian libraries difficult to use. Often researchers need specialized data which is hard for them to locate in the limited time available. This paper's purpose is to provide practical suggestions for scholars about overcoming the difficulties of using Asian libraries. It is intended to assist researchers in all fields, including those working on dissertations, and is written to help them change a frustrating and disappointing year into one more rewarding. These remarks are applicable for those parts of Asia which the author has visited: India, Pakistan, eleven more moslem, one Hebrew and one Christian country extending West to the U.A.R. and North to Turkey--and for those researchers whose material location problems are similar to the Asian reference problems with which the author has already dealt. (LI

004244 through 004262 and LI 004264 through 004267 are related.) (Author/NH)

**ED-142 232** Not available NTIS  
**Hawaii Univ., Honolulu. East-West Center.**

**Annotated Bibliography on Housing and Settlements for Low Income People**  
1976, 47p  
Available from ERIC Document Reproduction Service, Arlington, Va. 22210, PC\$2.06, MF\$0.83 Plus Postage.

Descriptors: \*Annotated bibliographies, \*Housing, \*Low income, Building materials, Climatic factors, Community development, Construction management, Demography, Economic factors, Energy, Health conditions, Sanitary facilities, Transportation.

Between May 19 and June 12, 1976, the participants of the 'Triad Operations Workshop: Training of Documentation Specialists for Low-Cost Housing Technology Programs' attended the Habitat Forum at Vancouver, Canada. During that period they had collected a number of documents from the various organizations and institutes that took part in the Forum. This annotated bibliography has been made as an attempt to disseminate the information acquired, and to complement a recently published 'Provisional Annotated Bibliography on Low Cost Housing and Related Topics' prepared by the East-West Technology and Development Institute. Both bibliographies are designed to become the stepping stone for a continuous undertaking of updating all information relevant to the subject matter. Countries represented at the workshop were: Indonesia; India; Korea; Pakistan; Philippines; Thailand; Australia; and the United States.

**ED-143 355** Not available NTIS  
**Community Education Multi-Media Bibliography**

Greg Mackey. Jul 77, 235p  
Best copy available.  
Available from ERIC Document Reproduction Service, Arlington, Va. 22210, PC\$12.71, MF\$0.83 Plus Postage.

Descriptors: \*Annotated bibliographies, \*Community education, \*Indexes(Locators), \*Instructional media, Institutions.  
Identifiers: \*Community education centers.

The purpose of this annotated bibliography in chart form is to acquaint community educators with what media materials are available where, on the topic of community education, based on a 1976 survey of community education centers and state department offices. The bibliography is divided into three color-coded sections of materials dated from 1965-1976: (1) materials listed by institution where they are available; (2) listings by types of materials, including cassettes, films, filmstrips, multimedia kits, overhead transparencies, printed handouts, reel tapes, simulations, slides, slide/filmstrip/tapes, and video tapes; and (3) entries by subject classification, arranged alphabetically by author within each subject. Information on category, topic/title, author, target audience, rating scale of effect on audience, date developed, length, color/black and white, availability, and local development is given to enable prior judgment as to suitability, target audience, and appeal.

**ED-150 967** Not available NTIS  
**Academy for Educational Development, Inc., Washington, DC. Information Center on Instructional Technology.**

**Film in Development**  
Apr 76, 12p Rept no. ICIT-14  
Available from ERIC Document Reproduction Service, Arlington, Va. 22210, PC\$1.67, MF\$0.83 Plus Postage. Pub. in Information Center on Instructional Technology Report; n14 Apr 1976.

Descriptors: \*Developing nations, \*Evaluation, \*Instructional films, \*Rural development, Cost effectiveness, Cultural differences, Culture contact, Films, Foreign culture, Rural education, Visual literacy.

The positive and negative aspects of using film as a medium for inducing change in developing na-

tions are explored in this issue. Critics of the use of film for development cite (1) the culture specific nature of film content of foreign produced films; (2) the technical, economic, and logistical problems of in-country production; and (3) lack of visual literacy among rural audiences. Proponents of film for development respond that film has greater impact than simpler media, that visual literacy is rapidly being developed, and that new technology already offers possibilities for lower cost and decentralized film and videotape production. Current uses of film in developing nations are described.

**ED-152 240** Not available NTIS  
**Academy for Educational Development, Washington, DC. Information Center on Instructional Technology.**

**Technology and Educational Reform: The Case of El Salvador**  
Henry T. Ingle. Jan 74, 10p  
Available from ERIC Document Reproduction Service, Arlington, VA. 22210, PC\$1.67, MF\$0.83 Plus Postage.

Descriptors: \*Developing nations, \*Educational development, Case studies(Education), Cost effectiveness, Educational improvement, Educational technology, Educational television, Evaluation, Instructional technology, Junior high schools.  
Identifiers: El Salvador.

The educational reform effort begun in 1968 in El Salvador is described in both English and Spanish. The first stage was aimed at alleviating the bottleneck in the school system at the junior high school level. Although the technology of instructional television was the most visible and highly publicized element of El Salvador's educational reform, it represented only one part of a fundamental and comprehensive change in the El Salvador school system. The reform's major components were new curricula, retrained teachers, student workbooks, teacher guides, and instructional television. Evaluation results showed increases in student learning and favorable student attitudes, but problems with teacher morale. Also discussed are cost issues and the future of the graduates of the reformed education system.

**ED-152 241** Not available NTIS  
**Academy for Educational Development, Washington, DC. Information Center on Instructional Technology.**

**Video Taping: A Medium for Social Change**  
Mar 74, 6p  
Available from ERIC Document Reproduction Service, Arlington, VA. 22210, PC\$1.67, MF\$0.83 Plus Postage.

Descriptors: \*Communications, \*Community development, Delivery systems, Developing nations, Educational technology, Instructional technology, Pilot projects, Rural development, Systems approach, Video tape recordings.

The use of video taping as a technique to bring villagers into meaningful communication with each other and with government leaders is discussed. Three pilot projects are described: (1) a United Nations funded project in Rajasthan, India; (2) a Tanzanian project involving several villages; and (3) the Skyriver, Alaska project. As demonstrated by these three projects, video taping technology shows potential for opening direct lines of communication between rural people and government agencies, gives villagers an opportunity to see themselves as part of a community, and raises community activism through participation in the formulation of community problems and solutions. However, the video technology must be part of a systematic process suited to local conditions before it can fulfill its potential.

**ED-152 244** Not available NTIS  
**Academy for Educational Development, Washington, DC. Information Center on Instructional Technology.**

**Technology and Educational Reform: The Case of Ivory Coast (Part I)**  
Stephen H. Grant. Oct 74, 10p  
Available from ERIC Document Reproduction Service, Arlington, VA. 22210, PC\$1.67, MF\$0.83 Plus Postage.



**Descriptors:** \*Developing nations, \*Educational development, Adult education, Curriculum development, Educational planning, Educational technology, Educational television, Elementary education, Inservice teacher education, Instructional technology, National programs, Rural development, Television curriculum.  
**Identifiers:** Ivory Coast.

This article traces the historical development of Ivory Coast's educational television system. Included are: (1) background information and initial planning, (2) structural organization including evaluation and maintenance, (3) provisions for inservice teacher training and adult education, (4) written materials production, and (5) program evolution. In addition to the television hardware, a completely revamped curricular program conceived in Ivory Coast for Ivorians was developed. The Ivorian educational television project is seen as a major tool for development, intended to benefit the overall youth of the country as well as the adult rural population.

**ED-152 245** Not available NTIS  
Academy for Educational Development, Washington, DC. Information Center on Instructional Technology.

## **Technology and Educational Reform: The Case of Ivory Coast (Part II)**

Stephen H. Grant. Feb 75, 12p  
Available from ERIC Document Reproduction Service, Arlington, VA. 22210, PC\$1.67, MF\$0.83 Plus Postage.

**Descriptors:** \*Developing nations, \*Educational television, Educational assessment, Educational development, Educational technology, Elementary education, Evaluation methods, Instructional technology, National programs.  
**Identifiers:** Ivory Coast.

This article examines the evaluative aspects of Ivory Coast's educational television system. It is less an analysis of evaluation results than a description of the types of evaluation data being generated. It discusses the development of the evaluation component of the project in terms of: (1) types of evaluation to be undertaken, (2) identity of funding agents, (3) organization of evaluation activities, (4) purpose and use of evaluation results, and (5) role of Ivorian nationals. Field teacher opinions and attitudes, statistical information relating to television teachers, and cost factors are also considered. A summary in Spanish of Parts I and II of the Ivory Coast educational television article is included.

**ED-152 246** Not available NTIS  
Academy for Educational Development, Washington, DC. Information Center on Instructional Technology.

## **Folk Media in Development**

Sep 75, 18p  
Available from ERIC Document Reproduction Service, Arlington, VA. 22210, PC\$1.67, MF\$0.83 Plus Postage.

**Descriptors:** \*Educational development, \*Folk culture, Developing nations, Educational technology, Family planning, Folk drama, Higher education, Information dissemination, Instructional technology, Mass media, Nonformal education, Rural development.

This issue is dedicated to folk media. Using Indonesia for his case study, Dr. Nat Colletta analyzes traditional culture as a medium for development. Juan Diaz Bordenave expresses doubts about adapting folk media to development objectives; Susan Hostetter and Arthur Gillette report on uses of the theater to promote development objectives; and Henry T. Ingle reviews three articles on the role of higher education in the development process in Latin America. Conference reports are included from: (1) the 1974 new Delhi Seminar and Workshop on Folk Media, (2) the 1972 IPPF/ UNESCO expert group meeting to discuss the integrated use of folk media and mass media in family planning communication programs, and (3) the 1975 East West Communication Institute Seminar on Traditional Media.

**ED-152 247** Not available NTIS  
Academy for Educational Development, Washington, DC. Information Center on Instructional Technology.

## **What Is Educational Technology**

Henry T. Ingle. Jun 75, 10p  
Available from ERIC Document Reproduction Service, Arlington, VA. 22210, PC\$1.67, MF\$0.83 Plus Postage.

**Descriptors:** \*Developing nations, \*Educational technology, \*Television, Commercial television, Educational development, Educational innovation, Educational television, Instructional technology.

Featured in this issue are the English translations of two speeches delivered to graduate students in educational technology at Pontificia Universidade, Porto Alegre, Brazil. Henry Ingle defines educational technology in the traditional as well as modern sense, describes its essential elements, and discusses situations in which the use of technology is most appropriate and efficient. He also provides a formula for failure in educational technology developed from practical experience. Theresza Penna Firme discusses the role of television as a technology in the lives of children, comments on the importance of the human element in technology, and emphasizes that all educational messages should be simple enough to be understood, relevant, and stimulating. Also in this issue is a description of an experimental audiovisual system called the electronic or tele-blackboard, which transmits scribbosonic (combination of speech and writing) signals.

**ED-152 249** Not available NTIS  
Academy for Educational Development, Washington, DC. Information Center on Instructional Technology.

## **Health Education by Open Broadcast**

Jul 76, 12p  
Available from ERIC Document Reproduction Service, Arlington, VA. 22210, PC\$1.67, MF\$0.83 Plus Postage.

**Descriptors:** \*Developing nations, \*Health education, \*Mass media, Adult education, Comedy, Delivery systems, Educational development, Educational radio, Educational technology, Folk culture, Information dissemination, Instructional technology, Marketing, National programs, Nonformal education, Radio.

This issue focuses on uses and techniques of radio for educational purposes in developing nations. Two health education projects are described which are utilizing open broadcasting to attract a mass audience of listeners not committed to a structured radio education program. Kenya's Swahili language radio serial, 'Giving Birth and Caring for your Children,' utilizes three popular radio comedians in an improvised dialogue integrating health information with humor. In Nicaragua, six one-minute radio messages on health topics will be broadcast ten to fifteen times per station per day for an entire year; this approach is based on commercial advertising strategy and philosophy. Also included in this issue are a report from the International Conference on Adult Education and Development held in Tanzania, and two reports on the use of folk culture in media development.

**ED-152 250** Not available NTIS  
Academy for Educational Development, Washington, DC. Clearinghouse on Development Communication.

## **Telemedicine: Health Care for Isolated Areas**

Jan 77, 8p  
Available from ERIC Document Reproduction Service, Arlington, VA. 22210, PC\$1.67, MF\$0.83 Plus Postage.

**Descriptors:** \*Developing nations, \*Health services, Communication satellites, Development, Educational development, Health education, Health facilities, Medical case histories, Medical services, Nutrition instruction, Rural clinics, Rural development, Rural education, Rural population, Telecommunication.

The lead article discusses the results of a series of experiments in rural Alaska in which telemedicine was used to improve the delivery of health care to

isolated populations. The author, Dennis Foote, also discusses the implications of these experiments for planning telemedicine systems in other areas. Satellite communication and a centralized computer based problem oriented medical record system played a major role in the project. A second article describes three educational endeavors in Tanzania: (1) Adult Education Year (1970); (2) Man is Health, a campaign designed to create an awareness of specific health problems among the rural population; and (3) Food is Life, a program to raise the level of functional literacy about the nutritional values of different foods. Also included are excerpts from a letter describing problems faced by a rural development communicator in India.

**ED-152 252** Not available NTIS  
Academy for Educational Development, Washington, DC. Clearinghouse on Development Communication.

## **The Nutrition Message and the Mass Media**

Sep 77, 12p  
Available from ERIC Document Reproduction Service, Arlington, VA. 22210, PC\$1.67, MF\$0.83 Plus Postage.

**Descriptors:** \*Developing nations, \*Nutrition instruction, Case studies (Education), Change agents, Change strategies, Educational development, Evaluation methods, Health education, Information dissemination, Mass media, Needs assessment.

Three articles are bound by two assumptions: (1) mass media can play a key role in nutrition education in developing nations, and (2) the full potential of mass media nutrition education programs will not be realized until project evaluation becomes more rigorous. Mark Rasmuson traces the evolution of mass media in nutrition education and describes three widely used media approaches. Joanne Leslie links the elements of a successful nutrition education project to the elements of a well conducted evaluation. In a second article, she reviews five nutrition projects and their evaluations. Also included in this bulletin is an account of a development project for educational radio which failed.

**ED-154 838** Not available NTIS  
Academy for Educational Development, Inc., Washington, DC.

## **The Use of Communications Media to Improve the Quality of Life in Technologically Developing Nations: A Strategic Overview**

Dwight W. Allen, and Philip R. Christensen. 1977, 105p

Sponsored in part by Agency for International Development, Washington, DC. Bureau for Technical Assistance.

Available from ERIC Document Reproduction Service, Arlington, VA. 22210, PC\$6.01, MF\$0.83 Plus Postage.

**Descriptors:** \*Developing nations, \*Instructional technology, \*Mass media, Basic skills, Change strategies, Decision making, Family planning, Health education, Improvement, Living standards, Use studies.

Strategies are examined for utilizing the mass communications media to improve standards of living within developing nations. This report, addressed to decision-makers in developing nations and the Agency for International Development (AID), is designed to assist them in planning their improvement communications programs. A general introduction is followed by three chapters providing a critical examination of available communication techniques, an analytic overview of specific educational goals, and an explanation of relevant change and decision-making strategies. The conclusion lists ten basic steps for creating a communication/education program for a technologically developing nation.

**ED-157 521** Not available NTIS  
National Library of Australia, Canberra.  
**Directory of Technical Information Sources for Industry. Networks Study No. 7**  
1978, 166p



Available from ERIC Document Reproduction Service, Arlington, VA. 22210, MF\$0.83 Only, Plus Postage.

Descriptors: \*Directories, \*Industry, \*Information sources, Information needs, Information networks, Information services, Libraries, Special libraries, Trade and industrial education.  
Identifiers: \*Australia.

This publication seeks to bring together sufficient details of information sources relating to the technical and scientific needs of industry so that workers can identify the most appropriate source for a given problem. Produced under the guidance of the Australian Industry Information Network Liaison Committee convened by the National Library of Australia, it contains 775 entries arranged by state or territory. Each entry provides the name and address of the institution, the name of the person to be contacted, a description of the subject fields covered, the library holdings (if any), and the consultancy services available. A subject index, data base and publications index, and an organization index are included.

**ED-158 704** Not available NTIS  
Academy for Educational Development, Washington, DC. Clearinghouse on Development Communication.  
**To and from the Field: Communications and Agriculture**  
Apr 78, 18p  
Available from ERIC Document Reproduction Service, Arlington, VA. 22210, PC\$1.67, MF\$0.83 Plus Postage.

Descriptors: \*Agricultural education, \*Developing nations, \*Information dissemination, \*Rural areas, Communication (Thought transfer), Demography, Educational innovation, Educational radio, Educational research, Information needs, Models, News media, Programming (Broadcast), Surveys.

Information on current research and projects, as well as general suggestions and conceptual material, is presented in 11 articles related to communication in rural areas of developing nations. These articles deal with (1) how information flows to small Nepalese farms; (2) an overview of communication in agricultural development projects, with descriptions of project models; (3) instruction of Bangladesh villagers via radio; (4) participatory communication in international agricultural research centers; (5) a Guatemalan radio education project in agricultural development; (6) an interview regarding agricultural education extension services; (7) a general analysis of the current status of rural education and agricultural development; (8) a rural development handbook for New Guinea village leaders; (9) regional universities; (10) highlights of the Fifth Pan-African Literacy Seminar; and (11) suggestions for agricultural information consulting.

**EIS-AA-72-5805-D** PC E05  
Agricultural Stabilization and Conservation Service, Washington, D.C.  
**Rural Environmental Assistance Program**  
Draft environmental impact statement.  
5 Dec 72, 116p USDA-ASCS-ES(Adm)-73-1, ELR-5805

Descriptors: \*Environmental surveys, \*Conservation, \*United States, Environmental surveys, \*Puerto Rico, Environmental surveys, \*Virgin Islands, Environmental surveys, Soil conservation, Water conservation, Forest land, Wildlife, Pollution, Abatement, Rural areas, Construction, Vegetation, Soil erosion.  
Identifiers: \*Environmental impact statements.

The report describes the Rural Environmental Assistance Program, the Federal Government shares with farmers and ranchers and the cost of carrying out approved soil, water, woodland, and wildlife conservation and pollution-abatement practices on their land. The program places emphasis on the carrying out of long-term, enduring conservation and pollution-abatement measures on farm and ranch lands in all States, Puerto Rico, and the Virgin Islands. The program will speed up and/or make possible the carrying out of needed conservation and environmental protection and enhancing measures in rural America. The impact on the

environment will be beneficial and largely cumulative. The stimulus of this program sets in motion total direct investments in a wide variety of conservation and pollution-abatement practices, by close to a million farmers and ranchers a year, amounting to double the public contribution. Adverse environmental effects of major consequence would not be anticipated, if good management is carried out by program participants. Some minor adverse environmental impacts may occur during the construction of water storage facilities, terraces, diversions, pollution-abatement, and other such measures, and during the establishment of vegetative cover and tree plantings because of soil being open for a short period of time to potential erosion and noise from construction and tillage equipment. (Author)

**EIS-AA-73-1451-F** PC A02/MF A01  
Water Resources Council, Washington, D.C.  
**Principles and Standards for Planning Water and Related Land Resources**  
Final environmental impact statement.  
4 Sep 73, 14p ELR-73-1451  
Supersedes report dated Jul 72, PB-205 224-D-S.

Descriptors: \*Environmental impact statements, \*Natural resources, \*United States, Environmental impact statements, Water resources, Land development, Conservation, Regional planning, Standards, Criteria, Participative management, Economic development, Environmental engineering, Esthetics, Reviews.  
Identifiers: EIS.

Principles and standards are established for planning the use of the water and land resources of the United States to achieve objectives, determined cooperatively, through the coordinated actions of the Federal, State, and local governments; private enterprise and organizations; and individuals.

**ERDA-tr-288** PC A02/MF A01  
Universidad de los Andes, Orinoco (Colombia).  
**Center for the Integral Development of "Las Gaviotas"**  
21p  
Translation: source information not available.

Descriptors: \*Dams, \*Hydroelectric power plants, Colombia, Construction, Design, Hydraulics, Hydroelectric power, Pipelines, Pumps, Research programs, Rural areas, Solar energy, Solar water heaters, Technology utilization, Transport, Water, Wind turbines.  
Identifiers: ERDA/130000, ERDA/140907, ERDA/170600, Translations.

The following research projects in Colombia, are described briefly: development and use of 0.5 to 1.0 kW hydraulic turbines for rural hydroelectric power generation; water pipeline construction; construction of small dams; water pump design; wind mill design; development of solar water heaters; testing of hydraulic rams; an earth-cement solar reflector; and design of a cassava shredder. (ERA citation 03:023340)

**ERDA-tr-298** PC A03/MF A01  
Inter-American Development Bank, Washington, D.C.  
**Contribution to the Analysis of the Development of Unconventional Energy Sources in Latin America**  
I. Escobar, and M. E. Ibacache. Apr 77, 32p  
Translation of Spanish report.

Descriptors: \*Biomass, \*Geothermal energy, \*MHD generators, \*Photovoltaic cells, \*Solar energy, \*Wind power, Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay, Venezuela, Education, Energy policy, Energy source development, Energy sources, Fossil fuels, Nuclear energy, Personnel.  
Identifiers: ERDA/299000, ERDA/292000, ERDA/210000, ERDA/140100, ERDA/150100, Translations, Spain, \*Latin America, Foreign countries.

The energy demand for Latin America will be satisfied by the end of the present century mainly

through utilization of its conventional hydraulic and fossil resources. Nuclear energy will experience a great development in Argentina, Brazil, and Mexico in the coming 20 years. The electronuclear alternative in other Latin American countries will be considerable depending on the degree of industrialization, geographical location and the possibilities for interconnecting networks for transmission and distribution of electrical energy in the country considered and depending on reduction in design scale and savings made in nuclear reactors presently in use (dropping down to capacities of about 150 MW per plant). The development of wind energy, thermal gradient of the ocean, solar energy, photovoltaic cells, processes of photosynthesis, MHD energy, geothermal energy, and tidal power as energy sources is discussed. (ERA citation 03:008613)

**ERDA-77-47/2** PC A04/MF A01  
Energy Research and Development Administration, Washington, D.C. Div. of Solar Energy.  
**Solar Program Assessment: Environmental Factors. Solar Agricultural and Industrial Process Heat**  
Mar 77, 56p

Descriptors: \*Agriculture, \*Industrial plants, \*Process heat, \*Environmental impacts, Air quality, Animal shelters, Construction, Environmental effects, Greenhouses, Land use, Noise, Safety, Solar air heaters, Solar collectors, Solar drying, Solar energy, Solid wastes, Steam generators, Thermal pollution, Water quality.  
Identifiers: ERDA/140905, ERDA/140907, ERDA/140400, \*Solar heating.

The major environmental issues associated with the further development of solar energy as a source of process heat in the industrial and agricultural sectors are presented and prioritized. Agricultural and industrial heating represents the specific application of a variety of Federally-funded solar technologies. To provide a background for this environmental analysis, the basic concepts and technologies of solar process heating are reviewed. The potential effects of these applications of solar energy on the full range of environmental concerns (e.g., air and water quality, biosystems, safety, social/institutional structures) are then discussed in terms of both their relative significance and possible solutions. Although the development of solar energy as a source of process heat will contribute to some environmental problems common to construction projects and energy-producing technologies (e.g., construction noise, thermal discharge to the air and water), only those impacts unique to the solar portion of the technology are discussed in depth. Finally, an environmental work plan is presented, listing research and development proposals and a National Environmental Policy Act (NEPA) document work plan which might help clarify and/or alleviate specific environmental and safety problems. (ERA citation 02:048094)

**ERDA-77-79** PC A05/MF A01  
Energy Research and Development Administration, Washington, D.C. Office of Planning, Analysis, and Evaluation.  
**Managing the Socio-Economic Impacts of Energy Development: A Guide for the Small Community**  
Sep 77, 82p  
Contract EA-77-C-10-0037

Descriptors: \*Communities, \*Energy source development, \*Socio-economic factors, Boom towns, Decision making, Economic growth, Economic impact, Economics, Employment, Environmental impacts, Evaluation, Government policies, Income, Information, Local government, Management, Planning, Public health, Recreational areas, Residential sector, Safety, Social impact, Solid wastes, State government, USA, Waste disposal, Water resources, Water treatment.  
Identifiers: ERDA/290200, ERDA/290300, ERDA/510500, ERDA/530100, ERDA/530200, Guidelines, Handbooks.

A decision concerning large-scale energy development is usually a complex one requiring cooperation of all levels of government as well as the general public and the private sector. The purpose of



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this handbook is to provide local officials with guidance regarding how they may assess, plan, and manage the socio-economic impacts of such development. Key areas of discussion in this report include: employment; personal income; housing; education; transportation; water supply; solid waste collection and disposal; waste water treatment; health care; recreation; and safety. It is unrealistic to expect the typical small community to develop capabilities to independently evaluate a highly technical development which to them is a one-time occurrence. Thus, local officials must be aware of resources which they may tap for information and assistance at other levels of government. This handbook advises local officials on how they should organize to most effectively participate in assessing, planning, and managing energy development and how to insure that information is collected and analyzed to reflect local priorities and future planning needs. (ERA citation 03:031111)

**E76-10338** PC A02/MF A01  
Sheffield Univ. (England). Dept. of Geography.  
**A Methodology for Small Scale Rural Land Use Mapping in Semi-Arid Developing Countries Using Orbital Imagery. I. Introduction**  
J. L. vanGenderen, and B. F. Lock. Jan 76, 8p  
NASA-CR-147221

Descriptors: \*Rural land use, Arid lands, Methodology, EREP, Skylab program, Mapping, Multispectral band scanners.

The author has identified the following significant results. This research program has developed a viable methodology for producing small scale rural land use maps in semi-arid developing countries using imagery obtained from orbital multispectral scanners.

**E77-10024** PC A02/MF A01  
Instituto Geofisco del Peru, Lima.  
**Application of Remote Sensing Techniques for the Study and Evaluation of Natural Resources in Peru**  
Progress rept.  
Jose C. Pomalaya. 1975, 3p NASA-CR-149127

Descriptors: Peru, Tropical regions, Pipelines, Rivers, Agriculture, Earth resources program, Phosphates, Mines(Excavations), Multispectral photography.

No abstract available.

**HCP/M3879-0003** PC A03/MF A01  
Resource Planning Associates, Inc., Washington, D.C.  
**Comprehensive Community Planning for Energy Management and Conservation: Developing and Applying a Coordinated Approach to Energy-Related Community Development. Executive Summary**  
Dec 77, 36p  
Contract EX-76-C-10-3879

Descriptors: \*Communities, \*Energy source development, \*North Dakota, Economic impact, Efficiency, Energy conservation, Energy consumption, Energy management, Environmental impacts, Europe, Financing, France, Human populations, Land use, National energy plan, Planning, Recovery, Rural areas, Social impact, Socio-economic factors, Waste heat.  
Identifiers: ERDA/290200, ERDA/510500, ERDA/298000, ERDA/530100.

This executive summary highlights and condenses the report HCP/M-3879/1, Vol. 1, which analyzes the community-development process and formulates an organizational approach to resolving the institutional and financial issues arising from energy-related community development. (ERA citation 03:021682)

**HCP/M3879-1(V.1)** PC A07/MF A01  
Resource Planning Associates, Inc., Washington, D.C.

**Comprehensive Community Planning for Energy Management and Conservation: Developing and Applying a Coordinated Approach to Energy-Related Community Development. Volume I**  
14 Oct 77, 140p  
Contract EX-76-C-10-3879

Descriptors: \*Communities, \*Energy source development, North Dakota, Economic impact, Energy conservation, Energy management, Environmental impacts, Europe, Financing, France, Human populations, Land use, National Energy Plan, Planning, Recovery, Rural areas, Social impact, Socio-economic factors, Waste heat.  
Identifiers: ERDA/290200, ERDA/510500, ERDA/298000, ERDA/530100, Mercer County(North Dakota).

To achieve the objectives of ERDA's Community Systems Program, physical and institutional characteristics that determine a community's levels and patterns of energy use must be defined and methods of coordinating its energy systems established. In Chapter 1, Managing Rapid Growth to Achieve the Goals of Energy-Related Community Development, the goals are identified and the development activities and management functions constituting an effective approach to achieving them are defined. The characteristic problems of rapid growth are described and their causes traced. In Chapter 2, Identifying Elements of a Community-Development Approach Applicable to the Rapid-Growth Context, a number of domestic and European community-development approaches that might be applicable to managing rapid growth in the boomtown context are surveyed. Applicable elements of a number of U.S. mechanisms and of two French community-development approaches that can serve as the basis for formulating an organizational approach are identified. In Chapter 3, Formulating a General Community-Development Approach, the effectiveness of the approach, its adaptability to the boomtown context, and its capability for achieving the goals of energy-related development are demonstrated. In Chapter 4, Adapting the General Approach to Mercer County, North Dakota, the complex rapid-growth situation in Mercer County, North Dakota, is described. Chapter 5 is entitled, Defining the Limitations of the Mercer County Approach and the General Approach. The content of Volume I is supplemented and supported by a series of appendices, assembled in Volume II. (ERA citation 03:021681)

**HCP/T4101-03** PC A05/MF A01  
MITRE Corp., McLean, VA. METREK Div.  
**Biomass-Based Alcohol Fuels: The Near-Term Potential for Use with Gasoline**  
W. Park, G. Price, and D. Salo. Aug 78, 84p  
Contract EG-77-C-01-4101

Descriptors: \*Automotive fuels, \*Ethanol, \*Methanol, Alcohols, Bioconversion, Biomass, Economics, Feasibility studies, Forecasting, Synthesis, Technology assessment, Thermochemical processes.  
Identifiers: ERDA/090210, ERDA/330800, ERDA/299003, Blends, \*Synthetic fuels.

This report serves as an introduction to the requirements and prospects for a nationwide alcohol-gasoline fuel system based on alcohols derived from biomass resources. Technological and economic factors of the production and use of biomass-based methanol and ethanol fuels are evaluated relative to achieving 5 or 10 percent alcohol-gasoline blends by 1990. It is concluded the maximum attainable is a nationwide 5 percent methanol or ethanol-gasoline system replacing gasoline by 1990. Relative to existing gasoline systems, costs of alcohol-gasoline systems will be substantial. (ERA citation 04:005430)

**HIT-693(V.2)(App.)** PC A17/MF A01  
Hittman Associates, Inc., Columbia, Md.  
**Comprehensive Community Planning for Energy Management and Conservation. First Interim Report. Volume II. Appendices**  
Apr 77, 391p  
Contract EC-77-C-10-0023

Descriptors: \*Communities, \*Energy analysis, \*Energy conservation, \*Energy management, Bibliographies, Engineering, Environmental impacts, Information retrieval, Land use, Planning, Reviews, Rural areas, Sociology, Systems analysis, Urban areas.  
Identifiers: ERDA/291000, ERDA/290100, ERDA/320100, ERDA/510500, ERDA/530100, State of the art.

This research effort performs a thorough survey of the state-of-the-art in each of the fields related to the community planning project for energy management and conservation. Appendix A describes the results of that survey. In attempting a major, interdisciplinary research and development project such as this one, it is necessary to integrate theory and practice from several fields. These include land use planning, political science, public administration, urban development, mechanical engineering, systems analysis, and the atmospheric sciences. The survey of current knowledge that was performed resulted in three major outputs. The first is an extensive bibliography of printed materials which are related to this project. The bibliography is presented as Appendix B at the conclusion of this document. The second major product of this task is an extensive set of abstracts of those relevant materials reviewed; this set of abstracts forms Appendix C. The third output of the survey is a set of reports of personal contacts with individuals or organizations that were either already working in the field of community energy analysis or were working in related fields. All contacts made were documented and contact reports are included in Appendix D. Appendix E is a description of community decision-making processes. (ERA citation 03:018384)

**HRP-0006853/6** PC A02/MF A01  
Kaiser Aluminum and Chemical Corp., Oakland, Calif.  
**Health Policies and International Corporations**  
James P. Hughes. Nov 75, 15p  
This paper was presented at the 1975 Annual Meeting of the American Public Health Association.

Descriptors: \*Environmental health, Water pollution, Sanitation, Safety hazards, Residential buildings, Public health, Occupational safety and health, Housing, Health care, Foreign countries, Disease vectors, Demography, Communities.

The human health impact of development projects conducted in emerging countries by international corporations is discussed. It is felt that the impact of such a project should be considered from the point of view of people residing in an area, the project's future neighbors, and those newly attracted to the project site. The direct health impact of a development project is examined in relation to communicable disease control, housing and sanitary facilities, dietary change, and the increased risk of road accidents. Direct health impacts of a development project on workers are concerned with work accidents, exposure to chemical and physical hazards, exposure to local diseases, and new disease vectors. The introduction of a major new project into a developing area is likely to create significant demands for a variety of social services, including medical care for project personnel and their dependents and for people ordinarily attracted to a development site. In addition, public health measures such as monitoring the safety of water and food supplies, the enforcement of sanitary regulations, and the control of disease vectors must be considered. Planning for health care in a development project must encompass therapeutic, preventive, and environmental services. A list of references is provided.

**HRP-0007411/2** Not available NTIS  
Rhode Island Univ., Kingston. Dept. of Industrial Engineering.  
**Maintenance System for a Small Hospital**  
Charles F. James, Joseph Stanislaw, and Sharad Wavde. 1970, 3p  
Pub. in Hospitals, Jnl. of the American Hospital Association v44 n24 p70-71, 74 16 Dec 70.

Descriptors: State regions, Specifications, Rhode Island, Personnel management, Performance standards, Methodology, Medical equipment,



Health resources, Health planning agencies, Health care technology, Health care facilities, Data processing, Data processing systems, Data collection, Data acquisition.

A system is described that includes both preventive and corrective maintenance for a small hospital, based on experience at the 142-bed Westerly Hospital in Rhode Island. Equally applicable to any small health care organization such as a nursing home, the system is based on a program of weekly inspection and maintenance. The following system elements are included: work order form and procedures for its utilization, full set of equipment data records, and weekly schedule for comprehensive preventive maintenance. Maintenance service needs are communicated by hospital staff to the maintenance department via the work order. Equipment data records contain the item and its description, name of manufacturer, initial installation cost, date when put in service, and equipment specifications. It is noted that the weekly schedule should remain flexible to enable the maintenance supervisor to use the skills of his employees to best advantage. A weekly maintenance schedule form which is coded to denote three categories of maintenance (overhaul, clean, and functional check) can be of assistance to the supervisor in determining the number of man-hours needed for the week, in general and for specific pieces of equipment. The system can be further refined for the purpose of charge - back accounting by key-punching certain data from work orders, and this information can be computerized to provide total man-hours, total maintenance costs, and accumulated totals of man-hours for individual classification.

**HRP-0007732/1** Not available NTIS  
International Development Research Centre, Ottawa (Ontario).  
**Low-Cost Rural Health Care and Health Manpower Training. An Annotated Bibliography with Special Emphasis on Developing Countries. Volume 1**  
Shahid Akhtar. 1975, 165p Rept no. IDRC-042e  
Available from the International Development Research Centre, Box 8500, Ottawa, Canada K1G 3H9, \$5.00.

Descriptors: \*Rural health services, \*Health manpower education, \*Bibliographies, \*Health care delivery systems, \*Developing countries, Sources, Rural areas, Research, Methodology, Information systems, Health resources, Health occupations, Health manpower, Health education, Health care, Health care services, Health care delivery, Foreign countries, Documents, Availability, Reviews.

An annotated bibliography is presented of literature pertaining to nontraditional health care delivery systems in remote regions of the world, particularly in developing countries. The literature cited focuses primarily on new models of health care delivery and on the training and utilization of auxiliary workers. The material is intended to be of use to persons involved in planning, operating, and evaluating systems to provide rural health services; persons concerned with the training of auxiliary health workers to staff such systems; and organizations supporting research into the problems of organizing and staffing health care delivery systems. An introductory discussion of issues and alternatives in rural health care precedes the listings, each of which includes complete bibliographical information and an abstract. The entries are categorized as follows: reference works; organization and planning, including health manpower, organization and administration, planning, geographic distribution of health services, financial aspects, cultural aspects, and epidemiological, family planning, nutritional, and maternal child health studies; primary health care implementation, including rural inpatient care, rural outpatient care, mobile units and services, and community health education; primary health manpower training and utilization, including primary medical care, primary nursing care, primary family planning and midwifery, primary dental care, primary laboratory care, primary environmental health, and teaching aids; and formal evaluative studies in each of the subcategories listed under organization and planning. Author, geographical, and subject indexes are provided. Seven hundred entries are included.

**HRP-0008008/5** Not available NTIS  
World Health Organization, Geneva (Switzerland).  
Div. of Strengthening of Health Services.  
**Health by the People**  
Kenneth W. Newell. 1975, 225p  
Available from the Q Corporation, 49 Sheridan Ave., Albany, N.Y. 12210, \$14.40.

Descriptors: \*Health care services, Rural health services, Rural areas, Projects, International relations, Health resources, Health related organizations, Health care facilities, Health care delivery, Foreign countries, Financing.

A series of articles on health care in developing countries is presented by the World Health Organization with emphasis on the condition of rural dwellers and solutions to their particular health problems. The following health care systems are noted for various countries: health care delivery system of the People's Republic of China, national health system in Cuba, Chimaltenango development project in Guatemala, Ayurvedic system of medicine in India, comprehensive rural health project in Jamkhed (India), community development approach to raising health standards in Central Java (Indonesia), health services development project in Iran, village health teams in Niger (Maradi Department), meeting basic health needs in Tanzania, and simplified medicine in Venezuelan health services. The examples of health care presented in the articles are considered to fall into three overlapping types of systems: (1) national exchange (China, Cuba, Tanzania); (2) extensions of existing systems (Iran, Niger, Venezuela); and (3) local community development (Guatemala, India, Indonesia). Four interconnected solutions are identified for health care financing: reallocate health resources more equitably between all segments of a population, introduce a program of self-reliance and self-sufficiency to all segments of a population, reserve a larger proportion of national health funds for the development and capital costs of primary health care services, and redesign existing government - supported and other health services to provide a more clearly defined supporting role.

**HRP-0009927/5** PC A06/MF A01  
Bureau of Community Health Service, Rockville, Md. Office for Family Planning.  
**Practical Suggestions for Family Planning Education**  
1975, 101p Rept no. DHEW/PUBL/HSA-75/16007  
Contract PHS-HSM-110-73-477

Descriptors: \*Health education, \*Health care delivery, \*Family planning, Strategy, Sources, Plans, Methodology, Information systems, Health planning, Health care, Documents, Consumers, Biomedical information systems, Availability, Objectives.

Educational activities within a family planning program are discussed in a report prepared under contract to DHEW's Bureau of Community Health Services. It is assumed that in-clinic education is important in family planning programs, and, based on this assumption, techniques for developing a family planning education program are suggested. Such techniques include problem identification and analysis, resource identification and use, and educational plan development. The goals and objectives of an educational plan are noted, and a checklist is provided for evaluating a family planning education program. The selection, development, and use of family planning educational materials are addressed, with emphasis on the advantages of educational materials, educational material guidelines, selecting from among family planning educational materials (printed, visual, and audiovisual materials), development of family planning educational materials, and appropriate use of materials. A model is described for the development of contraceptive educational materials which covers birth control pills, intrauterine devices, diaphragms, contraceptive creams and jellies, contraceptive foams, voluntary sterilization, and rhythm. A bibliography of family planning materials is provided.

**HRP-0010205/3** Not available NTIS  
World Health Organization, Geneva (Switzerland).

**Meeting Basic Health Needs in Developing Countries: Alternative Approaches**  
1975, 20p  
Pub. in WHO Chronicle v29 n5 p168-187 1975.

Descriptors: \*Health care services, \*Health care delivery, Rural health services, Rural areas, Research, Health manpower, Foreign countries.

Case studies are presented of primary health care projects undertaken in underdeveloped countries to identify the key factors in the success of such systems and to observe the effect of these factors in political, economic, and administrative frameworks. It appears that in underdeveloped countries, malnutrition and parasitic and infectious disease (including vector-borne, gastroenteric, and respiratory disease) are the main factors affecting health. Promising health programs were studied by World Health Organization and UNICEF teams in Bangladesh, Cuba, India, Niger, Nigeria, Tanzania, and Venezuela. In addition, visits were made to China and Yugoslavia. In some countries, there are complete countrywide health systems with a network of health workers from village to factory. In other countries, few resources are available and villagers are trained in the rudiments of primary care, disease prevention, and health education. They function as care-providers at the village level under the supervision (sometimes by two-way radio) of regional health care providers. Sometimes traditional medicine (acupuncture and Ayurvedic physicians in China and India) is incorporated with modern medical practice. The innovations reviewed in this article are sufficiently promising to warrant a major change in policy and direction permitting programs of the type described in the case studies to be fostered, extended, adapted, and used as examples for a large scale global program.

**HRP-0011537/8** Not available NTIS  
Loyola Univ., Chicago, Ill. School of Nursing.  
**RN in the Baccalaureate Program**  
Susan Dudas. 1968, 3p  
Pub. in Nursing Outlook p51-53 Jul 68.

Descriptors: \*Nurses, \*Health manpower education, Sociology, Research, Health occupations, Health education, Health care.

The effects of combining prenursing students and experienced registered nurses in the same baccalaureate program are examined in the context of the experience of medical-surgical nursing courses attended by both types of students. Out of 36 students enrolled for the 8-week course, ten were registered nurses with varied experiential backgrounds, including a director of nursing services, a nurse with one year's experience in a coronary care unit, several nurses with psychiatric experience, and some who had limited medical-surgical experience. The beginning nursing students in the same course had had two years of general education courses, including three science courses, a foundation course in nursing, and a 6-week summer session in clinical nursing. At the beginning of the course, the instructor discussed with both groups the reasons for their joint participation in the course. The greatest confusion and apprehension about the course was expressed by the prenursing students. Initially, the beginning students seemed concerned about the registered nurses' greater ability to participate in class discussions. However, as the course progressed, their confidence and participation increased. In their evaluations of the course, both groups described the advantages and disadvantages of joint participation. Registered nurses particularly felt that dividing the class into separate groups for clinical sessions was valuable, as this provided an opportunity for each group to proceed at its own rate. In a subsequent 8-week course, only two registered nurses were involved. The exchange of ideas between the basic students and the two registered nurses in this course is described as gratifying. The importance of looking at each registered nurse student as an individual when considering combining experienced nurses and new students in baccalaureate programs is emphasized. It is suggested that registered nurse students be provided opportunities to prove their expertise not only by paper tests but in clinical situations, so that the courses they are required to take will be the courses they need.



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**HRP-0013242/3** PC A05/MF A01  
Westinghouse Electric Corp., Columbia, Md. Population Center.  
**Guidebook for Family Planning Education**  
Sigrid G. Deeds. Dec 73, 95p

Descriptors: \*Health education, \*Family planning, Strategy, Social services, Project planning, Preventive medicine, Patients, Methodology, Health planning, Health care services, Education, Consumers.

Guidelines for designing and improving educational components of family planning programs are presented in a manual directed to the educational specialist or person responsible for the educational services of a family planning program. Methods and techniques for assisting couples in developing positive attitudes and behavior in regard to family planning are discussed. The manual, which is intended as a general framework for planning, provides direction in charting an educational plan and in taking the first steps toward implementing the plan. The opening section touches on aspects of educational relationships and distinctions, including education versus information; communication in educational planning; attitude and behavior change; public relations versus education; counseling, interviewing, and consulting; training; definition of the educational component in family planning programs; the role of the educational staff; and qualifications for a family planning educational coordinator. Steps in the planning process are described in detail, followed by suggestions concerning the selection of educational methods and materials. The closing section presents an overview of the use of a variety of educational methods and materials in family planning programs. Lists of references are provided throughout the manual, and selected sources for family planning information (films, slides, tapes, catalogs, materials lists, periodicals) are also listed.

**HRP-0013245/6** PC A09  
Michigan Univ., Ann Arbor. School of Public Health.  
**Some Health Sector Analysis Methods for Developing Nations**  
Lawrence H. Stiffman. May 74, 185p

Descriptors: \*Health planning, System analysis, Strategy, Quality assurance, Methodology, Measurement, Health care, Health care utilization, Health care facilities, Health care costs, Forecasting, Data processing, Data processing systems, Data analysis, Cost effectiveness, Benefit cost analysis.

Quantitative methods and techniques for health planning and management are described in a manual directed to developing nations. The catalog of health sector analysis methods has two purposes: (1) to present a selection of past analyses of components of the health sector; and (2) to evaluate these analyses in terms of their ability to identify choices in allocating scarce resources among competing objectives, activities, or strategies; to evaluate the consequences of alternative decisions in terms of health, economic improvement, and cost; and to identify the preferred alternative given available information, skills, and resources. Application of health sector analysis techniques is described at the national, regional, single facility, and single program level. The manual opens with a discussion of the constraints in using quantitative methods and techniques. Program budgeting applications are then described in both developed and developing countries, and examples of cost-effectiveness analysis are offered for cholera and malaria. Forecasting and operations research techniques are described at the health program management level. Examples are presented of methods for identifying data, organizing data into information, and analyzing and managing information in decisionmaking. Methods included are time series analysis, regression analysis, simple population and utilization projections, queuing and inventory theory, and network analysis. Analytic or optimizing models, including linear and dynamic mathematical programming and Markovian analysis, are described. Allocation models are described for decisionmaking in regard to tuberculosis, allocating, personnel moving patients, and environmental health. Supporting data,

graphs, flow diagrams, and a bibliography are included.

**HRP-0013419/7** Not Available NTIS  
California Univ., Los Angeles. School of Public Health.  
**Health Care Systems in World Perspective**  
Milton I. Roemer. 1976, 289p  
Available from Health Administration Press, M2240, School of Public Health, University of Michigan, Ann Arbor, MI 48109.

Descriptors: \*Health care delivery, \*Foreign countries, Research, Organization theory, Health resources, Health related organizations, Health occupations, Health manpower, Health care services, Health care facilities.

An international perspective on the delivery of health services is presented. A collection of 30 papers on health care systems throughout the world is organized according to five major sections. The first background section provides an overview of health care systems on an international basis in terms of time and space dimensions. The second section deals with developing countries and analyzes problems and practices in selected countries of Latin America, Asia, and Africa. The third section pertains to industrialized countries in Western Europe and North America, Australia, and the Soviet Union. The fourth section examines a number of specific health problems and problems related to manpower, facilities, and processes. General interpretive papers are included in the fifth section on special and often controversial issues in the health care field. A selected bibliography is provided.

**HRP-0013600/2** Not Available NTIS  
Queen Elizabeth Coll., London (England).  
**Rural Health Problems in Developing Countries: The Need for a Comprehensive Community Approach**  
Marie Therese Feuerstein. 1976, 16p  
Pub. in Community Development Jnl. v11 n1 p38-52 1976.

Descriptors: \*Rural health services, Theories, Sociology, Socioeconomic status, Socioeconomic factors, Rural planning, Rural areas, Methodology, Health planning, Health occupations, Health care, Health care services, Foreign countries, Demography, Communities.

A comprehensive community approach to rural health care is described as economical in that it emphasizes the use of existing community resources, auxiliary personnel, and appropriate technology. Activities relating to the development of the community approach in rural areas of developing countries are noted. The context in which rural health problems occur is explored. Poverty, isolation, and a lack of adequate basic health facilities contribute to rural health problems. Other factors which continue to characterize rural life in tropical and subtropical developing areas and which have a special bearing on health include reliance on agriculture and the employment of manpower rather than machines, the extended family system, large family size and crowded living conditions, the low status of women, early marriage and frequent childbearing, high illiteracy rates, conservative leadership, a high incidence of alcoholism, and the existence of an intricate socioreligious system which affects the interpretation and treatment of disease. The comprehensive community approach to health problems in rural developing areas is viewed as one which helps individuals and communities to perceive their health needs and assist them in using their internal and external resources to meet those needs. Eleven characteristics of the comprehensive community approach are delineated.

**HRP-0016123/2** PC A04/MF A01  
Pan American Health Organization, Washington, D.C.  
**Guide for the Organization of Health Services in Rural Areas and the Utilization of Auxiliary Personnel**  
1975, 72p

Paper is the recommendations of two PAHO/WHO Working Groups convened in Washington, D.C., in April 1974.

Descriptors: \*Rural health services, \*Health planning, Sanitation, Rural areas, Policies, Pediatrics, Objectives, Methodology, Health resources, Health manpower, Health care services, Guidelines, Foreign countries, Environmental health, Children, Child health services.

The overall objective of the two multidisciplinary working groups of the Pan American Health Organization was to develop a methodology for planning, organizing, and controlling programs in order to extend the coverage of health programs in rural areas. An organizational methodology is proposed for the extension of health service coverage to rural areas. The methodology is programmatic and involves an analysis of the situation, the definition of objectives and target populations, the determination of requirements, and execution. The proposed rural health program has three subprograms: (1) health care (maternal and child health and other direct health activities); (2) basic sanitation (water and excreta); and (3) statistics (statistics for health services and vital statistics). The role of rural communities in the utilization of health services and the implementation of the proposed rural health program is discussed. Functions and training requirements for auxiliary personnel working in rural areas are identified. Data are tabulated on the assignment of tasks in a rural health program. The infrastructure of the proposed rural health program is detailed, with emphasis on planning, organization, execution, control, and supervision. Forms and guidelines are included for the conduct of a rural health program. A list of references is provided.

**HRP-0016272/7** Not Available NTIS  
Victoria Univ. of Manchester (England).  
**Comprehensive Community Approach to Rural Health Problems in Developing Countries**  
Marie-Therese Feuerstein. 1976, 9  
Pub. in International Nursing Review v23 n6 p174-182 Nov-Dec 76.

Descriptors: \*Rural health services, \*Health planning, Theories, Rural planning, Participative management, Methodology, Management methods, Local government, Health related organizations, Health planning agencies, Consumers, Community relations.

The elements of the community development approach as it is applied to solving health problems in the rural areas of developing countries are described. It is first explained that the term 'community development' refers to a well-defined approach that relies on the active participation and initiative of the community itself. In applying the comprehensive community approach to solving health problems, it is necessary to view health activities within the context of planned national development. Long-term objectives include the evolution of members of rural communities into healthy citizens capable of sharing in health care responsibilities. In applying the comprehensive community approach, each country develops a specific pattern consistent with its own traditions, circumstances, and goals. Emphasis is placed on the concepts of integrated development, appropriate technology, and the employment of new categories of health personnel. Appreciation of the socio-cultural context within which health-related activities occur is essential as individual rural communities are helped to identify and prioritize their health needs in accordance with balanced local and national development. Self-help on the part of the communities is facilitated in part through special training for community leaders. While all members of the community are involved in the development effort, emphasis is placed on the involvement of women due to their influence on family health. Changes in attitudes are viewed as being as important as material changes.

**HRP-0016801/3** Not Available NTIS  
International Development Research Centre, Ottawa (Ontario).



## Low-Cost Rural Health Care and Health Manpower Training. An Annotated Bibliography with Special Emphasis on Developing Countries. Volume 2

Frances M. Delaney. 1976, 182p  
See also Volume 1, HRP-0007732.  
Available from UNIPUB, Box 433, Murray Hill Station, New York, NY 10016.

Descriptors: \*Rural health services, \*Health planning, \*Health manpower education, Theories, Sources, Rural planning, Rural areas, Research, Methodology, Health occupations, Health manpower, Health care, Health care services, Health care delivery, Foreign countries, Availability.

The second volume in a series of annotated bibliographies on low-cost rural health care and manpower training brings together information on non-traditional health care delivery systems in remote regions of the world, particularly in developing countries. The literature abstracted focuses primarily on new models of health care delivery and on the training and use of auxiliary health workers. The bibliography is directed to persons involved in planning, operating, and evaluating rural health services, in training auxiliary health workers to deliver such services, and in supporting research into the problems of organizing and staffing rural health care delivery systems. The entries are grouped under five major subject headings: reference works; organization and planning (health manpower, organization and administration, planning, geographic distribution of services, financial and cultural aspects, studies of epidemiology, family planning, maternal and child health, and nutrition); primary health care implementation (rural inpatient and outpatient care, mobile services, community health education); primary health manpower training and utilization (primary medical care, nursing care, family planning, midwifery care, dental care, laboratory care, environmental health); and formal evaluative studies. Approximately 700 books, journal articles, reports, studies, surveys, and unpublished documents are abstracted. Author, subject, and geographic indexes are provided, as are order coupons for obtaining materials through the International Development Research Centre in Ottawa.

HRP-0019765/7 Not Available NTIS  
Johns Hopkins Univ., Baltimore, Md.  
**Health Economics in Developing Countries**  
Alan L. Sorkin. 1976, 200p  
Available from D. C. Heath and Co., 125 Spring St., Lexington, MA 02173.

Descriptors: \*Health economics, Vital statistics, Strategy, Statistical distributions, Reviews, Projects, Programs, Population growth, Policies, Overpopulation, Objectives, Nutrition, Methodology, Medical personnel, Health resources, Health planning, Health occupations, Health manpower, Health care, Health care delivery, Health care costs, Guidelines, Foreign countries, Evaluation, Environmental health, Economics, Economic theory, Disease vectors, Demography, Communities.

In 1972 England spent \$100 per person to operate health services, the U.S. spent \$180, but the Ethiopian government spent less than 70 cents for the health care of each of its 22 million people. In developing countries at least one-half of all deaths occur among children under 5 years of age as a result of infectious diseases and malnutrition. Basic health problems and the implications of population growth and poor nutrition are discussed. Programs for nutrition and the eradication of disease bearing insects need priority status in many developing nations. Stages of health planning are suggested: developing effective planning organizations, planning policies and goals with the political group responsible for implementation, obtaining demographic and other data determining priorities, basing alternatives on cost-benefit considerations, constructing a plan, implementation, and evaluation. Major considerations and methods for assessing and projecting manpower requirements are: biologic demand, physician - population ratio, economic - demographic needs, and service targets -- the advantages, disadvantages, and appropriate situations required for each method are delineated. Ways of financing health care services are discussed. The problems and benefits of health centers and hospitals are explored. Mobile

units are important alternatives to permanent facilities in remote, sparsely settled regions. The distribution of professional personnel is discussed. In some areas, indigenous medical practitioners are being trained as health auxiliaries; in China, one million 'barefoot doctors' deliver basic health services to rural areas. Illustrative charts are provided.

HRP-0019781/4 Not Available NTIS  
Salem State Coll., Mass.  
**Testing the RN Student's Skills**  
Suzanne Rogers. 1976, 4p  
Pub. in Nursing Outlook v24 n7 p446-449 Jul 76.

Descriptors: \*Health manpower education, \*Nurses, \*Performance tests, Advanced programs, Continuing education, Curricula, Health care, Health manpower, Health occupations, Measurement, Medical personnel, Methodology, Nursing, Quality assurance, Registered nurses.

Registered nurses who enroll in the basic baccalaureate program at Salem State College, Massachusetts, are permitted to validate their skills in specified areas through testing in order to be exempted from sophomore and junior year nursing courses. To be exempt from the junior year nursing courses (24 credit hours), they must pass the National League for Nursing achievement tests in medical-surgical and maternal and child health nursing at the 50th percentile or higher. They must also receive a satisfactory clinical evaluation based on two performance tests. To measure the nurse's ability to respond in a variety of commonly encountered interactions in which patients or families exhibit anxiety, grief, hostility, or denial, a series of videotape sequences was developed during which the nurse writes her verbal and non-verbal responses and a rationale for the responses as if she were the nurse in that situation. These responses are then evaluated as most therapeutic, appropriate, or least appropriate. In order to measure the nurse's ability to use all of the steps of the nursing process in a specific care situation, the evaluator visits the nurse in her own work setting. The nurse is required to present an oral and a written presentation of a patient with whom she carried out each step of the nursing process, using the American Nurses' Association's Standards of Nursing Practice as a guide. The nurse and the evaluator then visit the patient together, and the evaluator interviews him. Following this, the evaluator meets the nurse in private to review the oral and written presentations. Of the 34 students evaluated, 15 have completed senior year nursing courses, and preliminary data on students' performance show that those evaluated at the junior year level are high performers in their senior year as compared to students not evaluated.

HRP-0019813/5 Not Available NTIS  
Pasadena City Coll., Calif.  
**From LVN (Licensed Vocational Nurse) To RN (Registered Nurse) in One Year**  
Marie A. Fasano. 1976, 3p  
Pub. in Nursing Outlook v24 n4 p251-253 Apr 76.

Descriptors: \*Health manpower education, \*Nurses, California, Continuing education, Curricula, Health occupations, Methodology, Nursing, Personnel development, Registered nurses, Retention, Students.

Legislation in California allows licensed vocational nurses to qualify for the State board examinations for registered nurses by taking an additional 30 credits in a community college nursing program. As a result, Pasadena City College has developed an associate degree program which involves 1 year's study after completion of certain general education requirements. Course work in this year covers pediatric, psychiatric, and advanced medical-surgical nursing; intensive care of patients following catastrophic illness; and disaster nursing. An initial assessment of the nursing competency of the vocational nurses is made prior to their entrance into the program, since the background of the students is extremely varied. While many have several years experience, others are recent graduates with only 1 year of experience or may not have practiced for many years. The vocational nurse students are permitted to reduce their clinical hours so that they can have instruction as a group. In the second semester, however, the

nurse-students spend all their time with the regular associate degree program students. All of the vocational nurses in the program were highly motivated, although many encountered personal problems related to their roles as students. The program also provides guidance and counseling on the role changes associated with the transition from licensed vocational nurse to registered nurse.

HRP-0025657/8 Not Available NTIS  
Stockton State Coll., Pomona, NJ.  
**From RN to BSN -- Faculty Perceptions**  
Alma S. Woolley. 1978, 6p  
Pub. in Nursing Outlook v26 n2 p103-108 Feb 78.

Descriptors: \*Health manpower education, \*Nurses, \*Personnel development, Curricula, Health care services, Health care, Health occupations, Nursing services, Nursing, Personal health services, Psychology.

Problems encountered in an accelerated program allowing technical nurses to earn baccalaureate degrees are analyzed. The program was initiated in 1975 at a State college in a rural area. To encourage modification of traditional behavior, the curriculum promotes self-direction and focuses on social, psychological, and cultural aspects rather than on acute care. Typical problems are minimal class participation, complaints about excessive work, failure to discuss problems with teachers, and criticism of faculty. The tension is attributed to the need to adopt new thinking, lack of free time, and ostracism by friends at old jobs. The educational change process is interpreted as socialization involving compliance, identification, and internalization. During the compliance phase students see new behavior as a means to an end without believing in change. Identification, in which students select desired behaviors from a role model, is characterized by conflict. In the integration phase belief in new concepts becomes genuine as students integrate them into their own value systems. Students are encouraged to take new jobs where they can apply their altered systems of belief. Planned change in professional education is brought about by unfreezing, changing, and refreezing: the teacher can further unfreezing by failing to confirm students' existing beliefs, by inducing guilt anxiety through comparisons of real and ideal, and by creating a safety zone through removal of change barriers. The need to analyze students' force fields before instituting change is emphasized. The students' anger during change is viewed as part of the grieving process associated with losing hold of familiar assumptions. The change process is only regarded as acceptable when it increases students' options.

HRP-0026654/4 Not Available NTIS  
State Univ. of New York Coll. at Utica-Rome.  
**American Indian Medicine and Contemporary Health Problems. Part II. Powerful Medicinal Plants in Traditional Iroquois Culture**  
James William Herrick. 1978, 9p  
Pub. in New York State Jnl. of Medicine, v78, n6, p979-987, May 78.

Descriptors: \*Ethnic groups, \*Health care, Classifications, Communities, Demography, Sociology.

An understanding of American Indian concepts of healing and medicine is necessary for effective health care planning for, and delivery to, Indian populations. This report examines the taxonomy of plants in Iroquois Indian culture as it relates to the establishment of criteria for determining the power possessed by medicinal plants. The Iroquois assign names to plants based on: structural features, functional features, resemblances to other plants, assumed kinship relations, utility, metaphoric statements, habitat, onomatopoeic devices, and noun roots. Plants are further classified according to gender and relationship, i.e., some plants have a localized relationship thought of as marriage which must be observed in their collection. The power of individual plants is attributed to either their general or communal power, e.g., nutrition, or their special power, e.g., divination or witchcraft. From the Iroquoian world view of a natural balance of complementary opposites, the hierarchy of medicinal plants is described as interactional and contextual rather than rigid. The Iroquois believe that disease is caused by offensive behavior.



ior, unfulfilled desires, contact with evil, and witchcraft, and the medicine of plants is used to counteract these influences. Symptomatic correlates have been developed to assist in determining the cause of a disease and thereby its treatment. For example, longstanding or chronic illnesses are attributed to unfulfilled desires and are believed to be alleviated by plants (e.g., ferns) used in divination by medicine societies or communal guessing. The skill and creativity of the herbalist are necessary to the correct and efficacious use of these medicine plants.

**HRP-0027818/4** PC A05/MF A01  
CPI Associates, Inc., Dallas, TX.  
**Health or Wealth -- Reassessment of an Old Dilemma**  
17 Jul 78, 94p

Descriptors: \*Health economics, Economic studies, Economics, Foreign countries, Health care, Health status, Measurement, Methodology.

Three essays focusing on the relationship between health needs and the need for economic development in less developed countries are presented. It is suggested that less developed countries try to equalize the distribution of health-related expenditures for different groups in the population. The inequity of health expenditures is more important than the actual amount spent. It is suggested that public sector spending for health services be increased. A long-term commitment to economic development should be undertaken as a strategy for improving health. Examples of the health versus development dilemma are provided. The many issues associated with the definition and measurement of the health of a nation's population are summarized. The uses and limitations of various methods of measurement are discussed, as are some of the key issues in the health and development problem. It is recommended that a systems analysis approach to health problems in developing countries be utilized.

**HRP-0029290/4** Not Available NTIS  
Villa Rosa Hospital, San Antonio, TX.  
**Hispanic Culture and Health Care -- Fact, Fiction, Folklore**  
Ricardo Arguio Martinez. 1978, 264  
Available from C. V. Mosby Co., 11830 Westline Industrial Drive, St. Louis, MO 63141.

Descriptors: \*Health care, Classifications, Communities, Demography, Ethnic groups, Health planning, Methodology, Socioeconomic status, Sociology, Strategies.

Selected readings related to Hispanic health care beliefs and practices are presented in a text intended for nurse practitioners and other allied health personnel. The objective is to provide information about Hispanic cultural foundations in order to decrease bias and encourage a more effective, holistic approach to health care planning and delivery. Among the subjects discussed are the significance of societal influence on the health attitudes and beliefs of Hispanics, with attention given to such cultural components as religion, language, and family structure and to the origins and formulation of folk medicine and its possible incompatibility with scientific health measures, as well as folk medicine and disease as social phenomena. An effort is made to examine the Mexican-American folk medical system and to compare it to scientific medicine. In addition, implications of the mutually satisfactory coexistence of the systems are considered. Finally, barriers that Mexican Americans face in acquiring and using institutional and community-based health services are considered and significant adaptive mechanisms and lifestyles that may contribute to Hispanic health care beliefs are addressed. An appendix deals with herbs and oils and their therapeutic uses.

**JPRS-43442** PC A02 MF A01  
Joint Publications Research Service, Washington, D. C.  
**North Vietnam: Translations No. 288.**  
24 Nov 67, 22p

Descriptors: \*Agriculture, \*Vietnam, Water supplies, Tropical regions, Cereals, Production,

Plants(Botany), Irrigation systems,  
Distribution(Economics).

Contents: Water conservancy to help make the winter-spring crop succeed; Ministry of Agriculture discusses measures to direct winter-spring crop; Rational irrigation for the fifth-month rice crop; Drought problems; Encouraging the large-scale production of organic fertilizer; Improving commodity distribution for peasants in Thai Binh Province; The need for increased production and supply of goods for feminine use; The need for families to plant medicinal plants.

**JPRS-52169** PC A02 MF A01  
Joint Publications Research Service, Washington, D.C.  
**Use of Krill for Food Protein.**  
N. I. Kryuchkova. 14 Jan 71, 7p  
Trans. of Obtaining Food Protein from Krill, pub. in Rybnoe Khozyaistvo (USSR) v46 n11 p53-56 1970.

Descriptors: \*Zooplankton, \*Food, Proteins, Chitins, Food processing, Meat, USSR, Translations. Identifiers: \*Krill.

Krill protein can be viewed as a highly valuable food product. The Okean protein paste obtained from krill in a frozen form can be used for preparing various dishes as well as in producing processed cheeses and other food products. The experiments conducted on sterilizing the protein paste and the freshly removed juice indicated that the sterilization temperature should not exceed 105C. At a temperature above 105C, the product turns dark and acquires an unpleasant aroma and taste. For food purposes it is possible to use fresh-caught krill kept on the deck for not more than 4 hours. The krill which has been on the deck for more than 4 hours since catching should be used for producing feed meal. The coagulation of protein from the krill juice is possible following two variations. The first provides for protein coagulation in a heat exchanger and then the removal of the produced protein from the broth by filtering or centrifuging. In following the second variation, the coagulation of the protein from the krill juice occurs directly in the cans in sterilization. Here the broth is not removed, and in this regard the output of finished products increases. (Author)

**JPRS-57636** PC A03/MF A01  
Joint Publications Research Service, Arlington, Va.  
**Analysis of Virgin-Land Grain Raising**  
F. T. Morgun. 30 Nov 72, 41p  
Trans. of mono. from Dumy O Tseline, Moscow, 1969 p110-151.

Descriptors: \*Grain, crops, Land use, \*Agronomy, USSR, Plant growth, Weeds, Wheat plants, Corn plants, Arid land, Translations. Identifiers: Virgin land.

The report discusses the problems encountered in developing the virgin lands in the period 1958-1965. (Author)

**JPRS-64646** PC A04/MF A01  
Joint Publications Research Service, Arlington, Va.  
**Survey of Rice Growing**  
P. S. Erygina. 29 Apr 75, 64p  
Trans. of mono. RIS, Moscow, 1970 p0063-0122, 0201-0215.

Descriptors: \*Rice plants, \*Cultivation, Climate, Soils, Fertilizers, Precipitation(Meteorology), Agronomy, Translations, USSR.

The report contains a description of the agroclimatic conditions of rice-growing areas and of agricultural technology.

**JPRS-72242** PC A14/MF A01  
Joint Publications Research Service, Arlington, VA.  
**Handbook on Agricultural Techniques for State Farms**  
15 Nov 78, 323p

Descriptors: \*China, \*Agriculture, Farm crops, Seeds, Hybridization, Agricultural machinery,

Planting, Cultivation, Harvesting, Plant genetics, Farms, Handbooks, Translations.

This report contains information on Chinese agricultural techniques including seed propagation, crop rotation and cultivation and agricultural machinery.

**LA-DC-13156** PC A02/MF A01  
Los Alamos Scientific Lab., N. Mex.  
**Waste Management in a Small, Widely Dispersed Mountain Community**  
L. A. Emelity, R. Garde, and C. W. Christenson. 1971, 25p Rept no. CONF-720618-1  
From 6. International Conference On Water Pollution Research- Jerusalem, Israel (18 Jun 1972).

Descriptors: \*Los alamos area N.

For abstract, see NSA 26 20, number 48486.

**LA-UR-78-1571** PC A02/MF A01  
Los Alamos Scientific Lab., NM.  
**Simple Technique of Estimating the Performance of Passive Solar Heating Systems**  
J. D. Balcomb, and R. D. McFarland. 1978, 6p  
Rept no. CONF-780808-15  
Contract W-7405-ENG-36  
Meeting of the American Section of the International Solar Energy Society, Denver, CO, USA, 28 Aug 1978.

Descriptors: \*Passive solar heating systems, Calculation methods, Performance, Sensible heat storage, Simulation, Thermal insulation, Trombe walls, Walls, Water. Identifiers: ERDA/140901, Solar heating.

A method is presented for estimating the annual solar performance of a building using a passive thermal storage wall of the Trombe wall or water wall type with or without night insulation. Tables of performance parameters are given for 84 cities. The method is accurate to +3% as compared with hour-by-hour computer simulations. (ERA citation 04:000454)

**LA-UR-78-2589** PC A02/MF A01  
Los Alamos Scientific Lab., NM.  
**Solar Heating Results for the Nambe Community Center**  
H. S. Murray, J. C. Hedstrom, and J. D. Balcomb. 1978, 6p Rept no. CONF-781102-2  
Contract W-7405-ENG-36  
Solar heating and cooling systems operational results conference, Colorado Springs, CO, USA, 29 Nov 1978.

Descriptors: \*Buildings, \*Passive solar heating systems, \*Rock beds, \*Solar heating systems, Cold storage, Control systems, Cooling, Design, Performance, Sensible heat storage, Solar air heaters, Solar collectors, Solar reflectors, Solar space heating, Thermal insulation, Thermal mass. Identifiers: ERDA/140901, Public buildings.

The Nambe Community Center is a solar heated adobe community building for the Nambe Indian Pueblo, located twenty miles north of Santa Fe, New Mexico. The 3000 ft exp 2 building makes use of several passive solar heating features. The active solar heating system is an air system using a 17 ton rock storage bed. The solar collector system consists of a 440 ft exp 2 vertical collector with a 1056 ft exp 2 reflector. The system also allows night evaporative cooling of the rock bed for summer cooling operation. The system became operational during the 1977-78 heating season, and solar heating data are presented for operation of the system in the spring of 1978. A discussion of using the rock bed for summer cold storage is also given. (ERA citation 04:022201)

**LA-UR-78-774** PC A02/MF A01  
Los Alamos Scientific Lab., NM.  
**State of the Art in Passive Solar Heating and Cooling**  
J. D. Balcomb. 1978, 9p Rept no. CONF-780337-5  
Contract W-7405-ENG-36  
National passive solar conference, Philadelphia, PA, USA, 15 Mar 1978.



Descriptors: \*Passive solar cooling systems, \*Passive solar heating systems, Buildings, Design, Research programs, Reviews, Technology assessment.  
Identifiers: ERDA/140901.

Progress since the Albuquerque Passive Conference is discussed in terms of the major design approaches in buildings actually being constructed. Advantages and problem areas of each are described. Major areas where further work is needed are presented in detail. (ERA citation 03:052275)

**LA-6489** **PC A02/MF A01**  
Los Alamos Scientific Lab., N.Mex.  
**Appropriate Technology and Navajo Economic Development**  
C. D. Kolstad, D. P. Grimmer, P. Reno, and J. M. Tutt. Oct 76, 13p  
Contract W-7405-eng-36

Descriptors: \*Communities, \*Economics, \*Rural populations, \*USA, Capital, Comparative evaluations, Economic development, Feasibility studies, Implementation, Materials, Minerals, Production, Socio-economic factors, Technology assessment.  
Identifiers: ERDA/290200, American Indians, Navajo Indians.

The history and economic status of the Navajo Indian Tribe are reviewed briefly. As measured by several yardsticks of economic well-being, the Navajo fall significantly below the rest of the United States. The Navajo have adopted an economic development plan "to bring the Navajo up to an equal footing with the rest of the nation." In view of these factors and the traditional rural settlement patterns of the Navajo, it is proposed that economic development within the Navajo Nation be aimed at encouraging increased productivity at a local level, in harmony with traditional values and lifestyles. Technology should be developed and adapted that can complement current Navajo life patterns. Technology appropriate for the Navajo would be of low capital cost, reliable, labor-intensive, personally satisfying to use, and decentralized. It is argued that appropriate technology can provide an increased material standard of living while permitting continuation of dispersed settlement patterns and traditional values. It is suggested that a Center be established as part of the Navajo Community College to develop appropriate technological aids for the Navajo and to implement this technology within the vast Navajo Nation. A possible structure for such a Center is offered, and it is suggested that a detailed study be undertaken to determine the feasibility of establishing the Center. (ERA citation 02:013726)

**LA-6637-C** **PC A16**  
Los Alamos Scientific Lab., N.Mex.  
**Passive Solar Heating and Cooling**  
M. H. Keller. 1976, 364p Rept no. CONF-760570-  
Contract W-7405-ENG-36  
Conference on passive solar heating and cooling, Albuquerque, New Mexico, United States of America (USA), 18 May 1976.

Descriptors: \*Passive solar heating systems, \*Solar cooling systems, \*Meetings, Leading abstract.  
Identifiers: ERDA/140901.

Separate abstracts were prepared for each of the 45 included papers. (ERA citation 02:048011)

**LA-6700-MS** **PC A04/MF A01**  
Los Alamos Scientific Lab., N.Mex.  
**Long-Term Strategies for Supplying Nitrogen to Crops**  
V. P. Gutschick. May 77, 73p  
Contract W-7405-ENG-36

Descriptors: \*Ammonia, \*Crops, \*Plant growth regulators, \*Plants, \*Chemical preparation, \*Nitrogen, Agriculture, Biosphere, Energy demand, Fertilizers, Food, Fossil fuels, Human populations, Nitrogen cycle, Nutrients, Synthesis.  
Identifiers: ERDA/553000, ERDA/560303, Farm crops, \*Haber process.

Raising food for present population requires nitrogenous fertilizers in addition to indirect management of the biosphere's nitrogen cycle. The Haber process for making the ammonia base of fertilizers is increasingly pressed by shortages of energy, while only minor improvements are still possible. I discuss the Haber process and 15 alternatives for increasing the nitrogen available to crops using less fossil energy. These alternatives span technology of fertilizer synthesis, farm management and technology, crop genetics, and market management. They were selected by criteria of energy-efficiency and of meeting the numerous biological/physical constraints posed by soils and plants. The alternatives vary in scope and efficacy due to scientific, economic, and political constraints which need to be appreciated by policy-makers and researchers alike. I conclude that the Haber process will be the mainstay for nitrogen-nutrition of crops for 50 years, and a few alternative strategies will slowly achieve a partial replacement of the Haber process. Full replacement in the longer run requires commitment within a few decades to developing the strongest alternatives. (ERA citation 02:049987)

**LBL-5927** **PC A03/MF A01**  
California Univ., Berkeley. Lawrence Berkeley Lab.  
**Ecological Considerations of the Solar Alternative**  
M. Davidson, D. Grether, and K. Wilcox. Feb 77, 48p  
Contract W-7405-ENG-48

Descriptors: \*Solar energy conversion, \*Wind power, \*Environmental impacts, Agriculture, Biomass, Ecosystems, Environmental effects, Ocean thermal power plants, Process heat, Solar air conditioners, Solar cells, Solar heating systems.  
Identifiers: ERDA/140400, ERDA/170500, Biological energy conversion, Photovoltaic cells, Solar cells.

The main solar technologies are considered including solar thermal power, photovoltaic cells, ocean thermal power, wind energy, solar heating and cooling, bioconversion, and agricultural and process heat. The direct and indirect ecological and environmental impacts of these technologies are discussed. (ERA citation 02:040426)

**LBL-6182** **PC A04/MF A01**  
California Univ., Berkeley.  
**Feed and Food from Desert Environments**  
J. A. Bassham. Sep 77, 53p Rept no. CONF-770960-1  
Contract W-7405-ENG-48  
International workshop on bio-saline research, Kiawah Island, SC, USA, 17 Sep 1977.

Descriptors: \*Arid lands, \*Farm crops, \*Hydrocarbons, \*Lubricating oils, \*Proteins, Agriculture, Carbohydrates, Biological adaptation, Biosynthesis, Climates, Deserts, Irrigation, Nutrients, Plant breeding, Research programs, Socio-economic factors, Terrestrial ecosystems, Water supply, Biomass, Ecosystems, Energy sources, Lubricants, Organic compounds, Petroleum products, Renewable energy sources.  
Identifiers: ERDA/510100, ERDA/553000, Jojoba oils, Euphorbic, Jojoba, Prosopis juliflora.

Research programs on controlled environmental agricultural technology to allow a broad range of conventional and unconventional crops to be grown with very limited supplies of fresh or brackish water are reviewed. The use of water derived from the sea, from saline lakes, or from waste water treatment for crops in arid lands is discussed. Plant breeding programs to improve the nutritional value of food crops and irrigation systems to improve plant productivity are discussed. The production of liquid hydrocarbons and lubricating oils from plant species such as Euphorbic and Jojoba, and the use of leguminous plants such as mesquite (Prosopis juliflora), and other native plants, which thrive in arid regions, as important sources of proteins and carbohydrates are cited as examples of the productive potential of arid lands. 41 references. (ERA citation 03:015879)

**LBL-7214** **PC A03/MF A01**  
California Univ., Berkeley. Lawrence Berkeley Lab.

**Potential of Arid Zone Vegetation as a Source of Substrates**  
J. A. Bassham. Nov 77, 44p Rept no. CONF-771158-1  
Contract W-7405-ENG-48  
Seminar on microbial conversion systems for food and fodder production and water management, Kuwait City, Kuwait, 12 Nov 1977.

Descriptors: \*Agriculture, \*Arid lands, \*Plants, Biochemical reaction kinetics, Carbon dioxide, Controlled atmospheres, Cultivation techniques, Deserts, Efficiency, Energy sources, Food, Forecasting, Photosynthesis, Plant growth, Productivity, Reviews, Solar energy conversion.  
Identifiers: ERDA/140504, Biological energy conversion.

Three aspects of the potential of vegetation in arid zones as a source of substrates are discussed. The first includes the limitations on efficiency of conversion of solar energy to the stored chemical energy of biomass in green plants, and the subsequent biochemical pathways of carbon dioxide fixation and biosynthesis. Second is the potential of plants endogenous to arid zones. Finally, the use of covered agriculture or controlled environmental agriculture (CEA) is considered both in its present form and in terms of possible extension to the large scale production of stable crops. (ERA citation 03:030556)

**LBL-7584** **PC A02/MF A01**  
California Univ., Berkeley. Lawrence Berkeley Lab.  
**Green Factories for Liquid Fuel**  
G. J. Calvin, and M. Calvin. Apr 78, 19p  
Contract W-7405-ENG-48

Descriptors: \*Alcohols, \*Biomass plantations, \*Synthetic petroleum, Agriculture, Bagasse, Distillation, Energy substitution equivalent, Extraction, Feasibility studies, Fermentation, Financial incentives, Hydrocarbons, Maize, Plant growth, Production, Sugar cane.  
Identifiers: ERDA/140504, ERDA/090122, ERDA/090222, Euphorbias, Synthetic fuels, Manufactured gas, Solid wastes, Refuse derived fuels.

The energy demand and shortage of fossil fuels are reviewed. The plants which can be grown for fermentation and those such as Euphorbias which produce hydrocarbons are discussed. It is suggested that the growth of these plants should be subsidized rather than paying the farmer to leave his land idle. (ERA citation 04:018338)

**LBL-7586** **PC A02/MF A01**  
California Univ., Berkeley. Lawrence Berkeley Lab.  
**Green Factories for Liquid Fuel**  
G. J. Calvin, and M. Calvin. Apr 78, 20p  
Contract W-7405-ENG-48

Descriptors: \*Biomass, \*Synthetic fuels, Agriculture, Economics, Production, Rubber trees, Sugar cane.  
Identifiers: ERDA/140504, ERDA/090122, ERDA/090222, ERDA/290000, Plants(Botany), Hevea brasiliensis, Euphorbia tirucalli, Euphorbia lathyris, Trees(Plants).

Various plants that could be and are being used for the production of synthetic fuels are discussed. Among these are Hevea brasiliensis, Euphorbia tirucalli, and Euphorbia lathyris. Advantages of fuel production from renewable plant resources are presented; cost estimates are included. (ERA citation 03:047098)

**LBL-8236** **PC A03/MF A01**  
California Univ., Berkeley. Lawrence Berkeley Lab.  
**Petroleum Plantations**  
M. Calvin. Apr 78, 41p Rept no. CONF-7804110-1  
Contract W-7405-ENG-48  
Conference on the Agricultural Chemical Society, Nagoya, Japan, 1 Apr 1978.

Descriptors: \*Biomass plantations, \*Synthetic petroleum, Alcohols, Arid lands, Carbon dioxide, Coal, Economic analysis, Energy substitution equivalent, Feasibility studies, Fermentation, Hydrocarbons, Photosynthesis, Plants, Resource potential, Sugar cane, Trees, Yields.



Identifiers: ERDA/140504, ERDA/090122, Chemical feedstock, Euphorbia bthyrus, Plants(Botany), Solid wastes, Manufactured gas, Synthetic fuels.

Photosynthesis is examined as an annually renewable resource for material and energy. The production of fermentation alcohol from sugar cane as a major source of materials for chemical feedstocks is examined as well as the direct photosynthetic production of hydrocarbon from known plant sources. Experiments are underway to analyze the hydrocarbons from Euphorbias and other hydrocarbon containing plants with a view toward determining their various chemical components. In addition, experimental plantings of several species of Euphorbias have begun to obtain data on which species would be most successful. Using Euphorbia lathyris, there are indications that we may expect a yield of approximately ten barrels of hydrocarbon material per acre in a seven-month growing period on semiarid land. (ERA citation 04:018339)

**MIT-EL-78-006** PC A02/MF A01  
Massachusetts Inst. of Tech., Cambridge. Energy Lab.  
**Micro Irrigation with Photovoltaics**  
D. V. Smith, and S. V. Allison. Apr 78, 22p  
Contract EX-76-A-01-2295-037

Descriptors: \*Developing countries, \*Irrigation, \*Solar water pumps, Capital, Economic analysis, Feasibility studies, Financing, Investment, Solar cell arrays.  
Identifiers: ERDA/140501.

One application of photovoltaics to irrigation water pumping is identified and analyzed: the case of the small farmer with 1-2 hectares of irrigable land and water available for pumping lift of under 5 meters. This application depends on resolution of the difficulty of financing capital investments for farmers currently operating at or below subsistence levels. (ERA citation 04:012809)

**NP-21727** PC A09/MF A01  
Minnesota Univ., Minneapolis.  
**Methanol: Its Synthesis, Use as a Fuel, Economics, and Hazards**  
D. L. Hagen. Dec 76, 186p  
Thesis.

Descriptors: \*Alcohol fuel cells, \*Automotive fuels, \*Boiler fuel, \*Diesel engines, \*Methanol, \*Otto cycle, \*Turbines, Bibliographies, Biological effects, Biomass, Biosynthesis, Boilers, Carbon dioxide, Carbonates, Chemical preparation, Combustion products, Economics, Environmental effects, Fermentation, Food, Fossil fuels, Fuels, Hazards, Performance testing, Production, Reviews, Safety, Synthesis, Technology assessment, Uses.  
Identifiers: ERDA/090200, ERDA/299003, ERDA/294000, ERDA/300501, ERDA/330800.

The synthesis of methanol using existing and proposed means of production and sources of feedstocks is reviewed. Conventional methods of producing methanol are surveyed. Proposed methods of fermentation, electro-, and radiation-synthesis are discussed. Conventional production technology from synthesis gas is examined in detail. The range of possible sources of feedstocks from fossil fuels to biomass, atmospheric carbon dioxide, and carbonates are portrayed along with renewable and nonrenewable energy sources. A survey of recent studies and research on methanol is given within the historical context. Fuel related properties are reviewed and compared with isooctane. Combustion emissions and their variation with temperature and fuel preparation are similarly compared. Uses of methanol as a combustion fuel and recent tests in boilers, turbines, conventional and stratified charge Otto engines, and diesel engines are discussed emphasizing comparative efficiencies. Current developments on the uses of methanol directly and indirectly in fuel cells and as a feedstock for single cell protein are examined. Historical prices of methanol are presented along with major causes for the fluctuations. The costs of synthesizing methanol are presented including overall production costs from organic feedstocks. Proposed costs of producing methanol from electrolytic hydrogen and carbon dioxide are also given. Fiscal and physical causes for inflation are

discussed along with the costs of storage, transportation and conversion. The numerous biological, physical, and chemical hazards of using methanol as a fuel are discussed together with safety precautions and treatment. 609 references. (ERA citation 02:040420)

**NP-22388** PC A04/MF A01  
Technical Univ. of Denmark, Lyngby.  
**Zero-Energy-House**  
V. Korsgaard. 1976, 60p  
U.S. Sales Only.

Descriptors: \*Houses, \*Solar heating systems, Design, Energy conservation, Heat recovery, Solar space heating, Solar water heaters, Thermal insulation.  
Identifiers: ERDA/140901, ERDA/320101, ERDA/299001, ERDA/291000, Denmark.

The zero-energy house is designed in such a way that it can be heated and supplied with hot water without using the traditional energy sources except for the normal electricity consumption of the household. This is primarily attained through effective thermal insulation and tightening of the house and by means of heat recovery from the used air and the waste water. In this way it should be possible to reduce the heat requirement to such a degree that it can for the most part be met by the inhabitants body heat and the waste heat from the domestic electricity consumption along with the solar radiation through the windows. The deficit is covered by means of an accumulating solar heating plant. The design, construction, performance tests, heat balance, solar energy system, heating and ventilation system, and energy economy are covered. (ERA citation 03:017233)

**NP-23208** PC A03/MF A01  
Lincoln Coll., Canterbury (New Zealand).  
**Ethanol from Agricultural Crops. Report No. 28. A Literature Survey**  
N. Kardos, and A. P. Mulcock. Nov 77, 26p  
U.S. Sales Only.

Descriptors: \*Ethanol, New Zealand, Automotive fuels, Biomass, Cost, Crops, Feasibility studies, Fuel substitution, Potatoes, Production, Sugar beets.  
Identifiers: ERDA/299003, ERDA/090200, ERDA/295000, Ethanol, Ethyl alcohol.

One way in which the diminishing supplies of petroleum products may be extended is by the use of substitute fuels--for example, natural gas or ethanol. But supplies of natural gas are themselves limited, and require processing to fuels such as methanol or liquified petroleum gas to be suitable for internal combustion engines. Ethanol is a fuel that may be produced from renewable resources by a simple process with inexpensive equipment. It has been, and still is, used in many countries in proportions as high as 25% without affecting engine performance. Ethanol can also be used as the starting point for many chemical syntheses and could replace petroleum products in the manufacture of some organic chemicals. In this paper the possibility of setting up an ethanol industry in New Zealand is discussed, and the practicability of producing ethanol at a reasonable price in sufficient quantity to make a significant impact on the total energy requirements of the country is examined. (ERA citation 04:003754)

**NSF/RA-760184** PC A08/MF A01  
Institute of Gas Technology, Chicago, Ill.  
**Wind-Powered Hydrogen Electric Systems for Farm and Rural Use. Final Report, May--December 1975**  
R. R. Tison, N. P. Biederman, T. Donakowski, R. H. Elkins, and J. B. Pangborn. Apr 76, 168p

Descriptors: \*Wind turbines, \*Hydrogen production, Farms, Economics, Electric power, Energy consumption, Energy storage, Feasibility studies, Power generation, Power supplies, Rural areas.  
Identifiers: ERDA/170601, \*Wind power generation.

The objective of this study has been to determine the current technology of a wind-energy conversion system (WECS) of minimal cost for rural appli-

cations. Specifically, IGT has evaluated available methods for converting shaft horse-power from a wind turbine to electricity and hydrogen. A workable mix of these two energy forms with storage that can support the energy needs of selected farming operations and the rural home was sought. Energy load patterns of several farming operations were examined for interfacing with the energy storage and delivery systems that are supplied by wind turbines dependent on the prevalent winds. Several preliminary designs have been completed so that a follow-up program for developing detailed designs and deconstruction units can be implemented if desired. (ERA citation 03:030701)

**NTIS/PS-75/655/1** PC N01/MF N01  
National Technical Information Service, Springfield, Va.  
**Synthetic Fuels from Municipal, Industrial, and Agricultural Wastes (A Bibliography with Abstracts)**  
Rept. for 1964-Aug 75  
Edward J. Lehmann. Aug 75, 41p\*

Descriptors: \*Solid waste disposal, \*Bibliographies, \*Energy sources, \*Synthetic fuels, \*Reclamation, Refuse, Organic wastes, Agricultural wastes, Sewage, Waste papers, Wood wastes, Methane, Oils, Ammonia, Carbon monoxide, Methyl alcohol.

The bibliography covers research efforts aimed at aspects of producing synthetic fuels--gases and liquids--from solid wastes. These wastes include manure, sewage, paper and wood. In most citations, methane is the primary fuel produced; however the production oils, ammonia, carbon monoxide, and methyl alcohol is also discussed. (Contains 36 abstracts)

**NTIS/PS-77/0112/1** PC N01/MF N01  
National Technical Information Service, Springfield, Va.  
**Synthetic Fuels from Municipal, Industrial, and Agricultural Wastes (Citations from the NTIS Data Base)**  
Rept. for 1964-Feb 77  
Audrey S. Hundemann, and Edward J. Lehmann. Mar 77, 88p\*  
Supersedes NTIS/PS-76/0795, and NTIS/PS-75/655. See also NTIS/PS-77/0113.

Descriptors: \*Bibliographies, \*Synthetic fuels, \*Solid waste disposal, \*Energy sources, \*Reclamation, Refuse, Organic wastes, Agricultural wastes, Sewage, Waste papers, Wood wastes, Methane, Oils, Ammonia, Carbon monoxide, Methyl alcohol.

Research efforts directed toward production of gaseous and liquid synthetic fuels from solid wastes are discussed. Waste products used in the syntheses include manure, sewage, paper, and wood. In most citations, methane is the primary fuel produced; however, the production of oils, ammonia, carbon monoxide, and methyl alcohol is also discussed. (This updated bibliography contains 83 abstracts, 12 of which are new entries to the previous edition.)

**NTIS/PS-77/0113/9** PC N01/MF N01  
National Technical Information Service, Springfield, Va.  
**Synthetic Fuels from Municipal, Industrial and Agricultural Wastes (Citations from the American Petroleum Institute Data Base)**  
Rept. for 1975-Nov 76.  
Mar 77, 237p\*  
See also NTIS/PS-77/0112.

Descriptors: \*Bibliographies, \*Synthetic fuels, \*Solid waste disposal, \*Energy sources, \*Reclamation, Refuse, Organic wastes, Agricultural wastes, Sewage, Waste papers, Wood wastes, Methane, Oils, Ammonia, Carbon monoxide, Methyl alcohol, Sludge, Garbage, Chips, Automobile tires.

The bibliography cites worldwide literature on the production of fuels from waste materials such as animal manure, wood chips, sewage sludge, urban garbage, agricultural wastes, and old automobile tires. (Contains 226 abstracts)



**NTIS/PS-78/0006/3** PC N01/MF N01  
National Technical Information Service, Springfield, Va.  
**Greenhouse Design, Construction, and Operation (Citations from the Engineering Index Data Base)**  
Rept. for 1970-Dec 77  
Audrey S. Hundemann. Jan 78, 130p\*

Descriptors: \*Bibliographies, \*Greenhouses, Space heating, Solar space heating, Waste heat utilization, Structural plastics, Sheet glass, Heat loss, Heat transfer, Wind pressure, Thermal efficiency, Design, Construction, Performance.

Thermal environment, construction materials, and structural integrity of greenhouses are discussed in abstracts from worldwide literature. Topic areas cover the use of plastics and glass in greenhouse construction, with emphasis on the use of plastics; heating with solar energy and waste heat; methods of reducing heat loss; and wind load and wind induced heat transfer studies. Abstracts on air supported greenhouses and combination greenhouse-solar distillation units are included. (Contains 123 abstracts)

**NTIS/PS-78/0417/2** PC N01/MF N01  
National Technical Information Service, Springfield, Va.  
**Wind Power (Citations from the Engineering Index Data Base)**  
Rept. for 1970-Apr 78  
Audrey S. Hundemann. May 78, 238p\*

Descriptors: \*Bibliographies, \*Wind power generation, \*Windmills, Electric power generation, Wind turbines, Windpowered generators, Design, Structural engineering, Feasibility, Efficiency, Cost effectiveness, Abstracts.

Windmill and wind power feasibility, use, and engineering are discussed in these citations of worldwide research. Abstracts primarily cover the use of wind power for electric power generation and wind turbine design and performance. General studies dealing with the use of wind power in developing countries and comparative analyses of wind power and alternative energy sources are included, as are studies on energy storage systems. (This updated bibliography contains 231 abstracts, 81 of which are new entries to the previous edition.)

**NTIS/PS-78/0419/8** PC N01/MF N01  
National Technical Information Service, Springfield, Va.  
**Aquaculture. Part 2. Shellfish. Volume 1. 1968-1976 (A Bibliography with Abstracts)**  
Rept. for 1968-76  
Robena J. Brown. May 78, 278p\*

Descriptors: \*Bibliographies, \*Shellfish, \*Aquaculture, Clams, Crustacea, Lobsters, Mollusca, Oysters, Shrimps, Renovating, Mussels, Ocean bottom, Animal nutrition, Seafood, Food processing, Reproduction(Biology), Animal diseases, Toxicity.

Citations include data on clams, crayfish, crustacea, lobsters, mollusca, oysters, and shrimps. Restoration of shellfish beds, hybridization, selection, nutritional requirements, and related studies are covered. Requirements for the reproduction, growth, feeding, and habitat are cited. (This updated bibliography contains 273 abstracts, none of which are new entries to the previous edition.)

**NTIS/PS-78/0420/6** PC N01/MF N01  
National Technical Information Service, Springfield, Va.  
**Aquaculture. Part 2. Shellfish. Volume 2. 1977-April, 1978 (A Bibliography with Abstracts)**  
Rept. for 1977-Apr 78  
Robena J. Brown. May 78, 80p\*

Descriptors: \*Shellfish, \*Bibliographies, \*Aquaculture, Clams, Crustacea, Lobsters, Mollusca, Oysters, Shrimps, Renovating, Ocean bottom, Mussels, Animal nutrition, Seafood, Food processing, Reproduction(Biology), Animal diseases, Toxicity.

Citations include data on clams, crayfish, crustacea, lobsters, mollusca, oysters, and shrimps. Res-

toration of shellfish beds, hybridization, selection, nutritional requirements, and related studies are covered. Requirements for the reproduction, growth, feeding, and habitat are cited. (This updated bibliography contains 75 abstracts, all of which are new entries to the previous edition.)

**NTIS/PS-78/0673/0** PC N01/MF N01  
National Technical Information Service, Springfield, Va.  
**Alcohol Fuels (Citations from the NTIS Data Base)**  
Rept. for 1964-Jun 78  
Diane M. Cavagnaro. Jul 78, 193p

Descriptors: \*Bibliographies, \*Alcohols, \*Fuels, Synthesis(Chemistry), Chemical analysis, Performance evaluation, Process charting, Industrial plants, Economics, Methyl alcohols, Ethanol, Cost analysis, Pollution, Feasibility, Air pollution, Water pollution, Sources.  
Identifiers: \*Synthetic fuels.

The bibliography covers Federally-funded research on alcohol based fuels that might have to be used in the future as a fuel source. The citations cover synthesis, chemical analysis, performance testing, processing, pollution, economics, environmental effects, and feasibility. (This updated bibliography contains 187 abstracts, 59 of which are new entries to the previous edition.)

**N68-20393** PC A06 MF A01  
Universidad Autonoma de San Luis Potosi (Mexico). Escuela de Ingenieria.  
**Stabilization of sub-Base and Base Materials for Pavement.**  
Estabilization de Materiales Para Sub-base Y Base de Pavimentacion  
J. F. Sandoval. 1967, 121p  
Lang- in Spanish

Descriptors: \*Asphalt, \*Calcium oxides, \*Cements, \*Pavements, \*Stabilization, Foundations, Hydrates, Roads, Substrates.

For abstract, see STAR 0610

**N72-28508** PC A02/MF A01  
Scientific Translation Service, Santa Barbara, Calif.  
**Problems in the Construction of Woodworking Machines**  
W. Schmutzler. Jul 72, 24p Rept no. NASA-TT-F-14398  
Contract NASW-2035  
Tran- Transl. Into English From Holz Roh. Werkstoff (Berlin), V. 26, No. 7, Jul. 1968 P 237-243

Descriptors: \*Machine tools, \*Roller bearings, \*Shafts (machine elements), \*Wood, Loads (forces), Lubrication, Noise reduction, Spindles.

For the construction of modern wood working machines, problems such as the most favorable tool spindle and shaft bearings play an important part. The construction and functional details of these machines are considered. The interrelationships are discussed of speed, bearing load, fit and lubrication, as well as bearing devices and their installation. The particulars of motor shaft bearings are considered along with questions concerning oscillating shafts. Another, equally important construction detail is the chip suction system. Defects that might occur in the construction of suction hoods or at the machines themselves are described. Finally, questions of noise abatement, its cause and elimination are discussed. (Author)

**N73-33460/9** PC E11/MF A01  
New Mexico Univ., Albuquerque. Technology Application Center.  
**Proceedings of Symposium on Utilization of Waste Glass in Secondary Products**  
25 Jan 73, 365p Rept no. NASA-CR-135792  
Subm-Sponsored by NASA. Conf-Confer. Held at Albuquerque, N. Mex., 24-25 Jan. 1973; Sponsored by N. Mex. Univ., Glass Container Manufacturers Inst., Inc., and Albuquerque Dept. Of Environ. Health.

Descriptors: \*Conferences, \*Glass, \*Waste utilization, Asphalt, Cements, Composite materials, Concretes, Glass fibers, Pavements.  
Identifiers: NASA.

Papers are reported which were presented at the conference on waste glass recovery and re-use in secondary products. The uses considered include: road surfacing, asphaltic concretes, road construction, terrazzo, cement concrete, pozzolan, glass wool, glass-polymer composites, and tiles. Problems of recycling glass in remote areas, and the economics and markets for secondary glass products are discussed.

**N74-15752/0** PC A02/MF A01  
Kanner (Leo) Associates, Redwood City, Calif.  
**Utilization of Wind Power in Agriculture in the USSR**  
D. Stein. Feb 74, 13p Rept no. NASA-TT-F-15345  
Contract NASW-2481  
Tran-Transl. Into English from Elektrizitaetswirtschaft (West Germany), V. 40, No. 4, 5 Feb. 1941 p 54-56.

Descriptors: \*Agriculture, \*Windpower utilization, U.  
Identifiers: NASA.

Wind motors are being used in Russian agriculture for milling and pumping water. Plans call for rapid expansion of the utilization of such power plants. The extent of present utilization, problems, and forecasts are outlined. (Author)

**N74-16801/4** PC A02/MF A01  
Linguistic Systems, Inc., Cambridge, Mass.  
**Using the Energy of the Wind for Electrification**  
V. R. Sektorov. Feb 74, 18p Rept no. NASA-TT-F-15307  
Contract NASW-2482  
Tran-Transl. Into English from Elektrichestvo, (Ussr), No. 3 March 1953 p 11-16.

Descriptors: \*Agriculture, \*Electric power supplies, \*Windpowered generators, Electric power plants, Flywheels, Rural areas, Windpower utilization.  
Identifiers: NASA.

The utilization of wind energy for generating electric power is discussed. Existing power generators utilizing wind energy are described and their use in agriculture is indicated. (Author)

**N75-16128/1** PC E99/MF A01  
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.  
**Water Hyacinths for Removal of Phenols from Polluted Waters.**  
B. C. Wolverton. 5 Feb 75, 18 Rept no. NASA-TM-X-72722

Descriptors: \*Phenols, \*Plants (Botany), \*Water pollution, Bayous, Ecology, Environmental monitoring, Evapotranspiration, Gas chromatography, Hydroponics, Plant roots.

Removal of phenol by water hyacinths (Eichhornia crassipes (Mart.) Solms) in static water was investigated. 2.75 g dry weight of this aquatic plant demonstrated the ability to absorb 100 mg of phenol per plant per 72 hours from distilled water, river water, and bayou water. One hectare of water hyacinth plants is shown to be potentially capable of removing 160 kg of phenol per 72 hours from waters polluted with this chemical. (Author)

**N75-16129/9** PC A02/MF A01  
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.  
**Water Hyacinths for Removal of Cadmium and Nickel from Polluted Waters.**  
B. C. Wolverton. 5 Feb 75, 11p Rept no. NASA-TM-X-72721

Descriptors: \*Cadmium, \*Nickel, \*Plant roots, \*Water pollution, Aqueous solutions, Material absorption, Pollution control, Trace contaminants.



Removal of cadmium and nickel from static water systems utilizing water hyacinths (*Eichhornia crassipes* (Mart.) Solms) was investigated. This aquatic plant demonstrated the ability to rapidly remove heavy metals from aqueous systems by root absorption and concentration. Water hyacinths demonstrated the ability to absorb and concentrate up to 0.67 mg of cadmium and 0.50 mg of nickel per gram of dry plant material when exposed for a 24-hour period to waters polluted with from 0.578 to 2.00 ppm of these toxic metals. It is found that one hectare of water hyacinths has the potential of removing 300 g of cadmium or nickel from 240,000 liters of water polluted with these metals during a 24-hour period. (Author)

**N75-16206/5** PC A02/MF A01  
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.  
**Aquatic Plants for Removal of Mevinphos from the Aquatic Environment.**  
B. C. Wolverton. Feb 75, 8p Rept no. NASA-TM-X-72720

Descriptors: \*Pesticides, \*Plants (Botany), \*Water pollution, Bioassay, Biological effects, Ecology, Environmental monitoring, Fishes, Grasses, Plant roots.

Fragrant waterlily (*Nymphaea odorata*, Ait.), joint-grass (*Paspalum distichum* L.), and rush (*Juncus repens*, Michx.) were used to evaluate the effectiveness of vascular aquatic plants in removing the insecticide mevinphos (dimethyl-1-carbomethoxy-1-propen-2-yl phosphate) from waters contaminated with this chemical. The emerged aquatic plants fragrant waterlily and joint-grass removed 87 and 93 ppm of mevinphos from water test systems in less than 2 weeks without apparent damage to the plants; whereas rush, a submersed plant, removed less insecticide than the water-soil controls. Water-soil control still contained toxic levels of this insecticide, as demonstrated by fish bioassay studies, after 35 days. (Author)

**N75-17045/6** PC A06/MF A01  
World Meteorological Organization, Geneva (Switzerland).  
**A Survey of Meteorological and Hydrological Data Available in Six Sahelian Countries of West Africa. A Survey of Studies in Meteorology and Hydrology in the Sudano-Sahelian Zone of West Africa.**  
E. G. Davy. 1974, 125p Rept no. WMO-379  
Partly in English and Partly in French.

Descriptors: \*Africa, \*Agriculture, \*Drought, \*Economic development, \*Meteorological services, \*Precipitation (Meteorology), Chad, Hydrometeorology, Mali, Mauritania, Niger, Rain, Senegal, Upper volta, Weather stations.

A meteorological and hydrological survey was made in six West African countries, namely, Upper Sahel, Upper Volta, Mali, Mauritania, Niger, Senegal, and Chad. The survey was carried out in conjunction with an economic development program particularly oriented to the severe drought problem of the Sahelian regions. Urgent investigation is needed in four areas: weather/crop correlations, weather/run-off correlations and maps of agricultural and water resources potential, periodic recurrence and persistence of rainfall, and droughts in relation to general atmospheric circulation. A list of stations and their services is included.

**N75-17786/5** PC A03/MF A01  
Kanner (Leo) Associates, Redwood City, Calif.  
**Wind Power Machines.**  
U. Hutter. Feb 75, 26p Rept no. NASA-TT-F-16195  
Contract NASW-2481  
Transl. Into English from the Book "Huetten, des Ingenieurs Taschenbuch" Berlin, Wilhelm Ernst and Son, 1954 p 1030-1044.

Descriptors: \*Wheels, \*Windmills (Windpowered machines), Aerodynamic characteristics, Wind-power utilization.

Basic aerodynamic features of wind power and wind wheels are discussed. The adaptation of wind

power to running machinery is described. Developments in wind power are illustrated, followed by a brief outline of operating properties. (Author)

**N75-22937/7** PC A02/MF A01  
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.  
**Water Hyacinths and Alligator Weeds for Removal of Lead and Mercury from Polluted Waters.**  
B. C. Wolverton, and R. C. McDonald. 11 Apr 75, 14p Rept no. NASA-TM-X-72723

Descriptors: \*Lead (Metal), \*Mercury (Metal), \*Pollution control, \*Vegetation growth, \*Water pollution, Absorptivity, Machining, Tables (Data), Toxicity.

Removal of lead and mercury by water hyacinths (*Eichhornia crassipes*) (Mart.) Solms and alligator weeds (*Alternanthera philoxeroides*) (Mart.) Griesb. was investigated. Water hyacinths demonstrated the ability to remove 0.176 mg of lead and 0.150 mg of mercury per gram of dry plant material from distilled water and river water in a 24-hour period. One acre of water hyacinths is potentially capable of removing 105.6 grams of lead and 90.0 grams of mercury per day. Alligator weeds removed 0.101 mg of lead per gram of dry plant material in a 24-hour period. This same plant also demonstrated the ability to remove a minimum of 0.153 mg of mercury per gram of dry plant material in a six hour period. (Author)

**N75-24163/8** PC A02/MF A01  
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.  
**Water Hyacinths and Alligator Weeds for Removal of Silver, Cobalt, and Strontium from Polluted Waters.**  
B. C. Wolverton, and R. C. McDonald. May 75, 14p Rept no. NASA-TM-X-72727

Descriptors: \*Cobalt, \*Silver, \*Strontium, \*Water pollution, Carcinogens, Heart diseases, Plant roots, Radioactive wastes, Trace contaminants, Water treatment.

Water hyacinths and alligator weeds demonstrated the ability to rapidly remove heavy metals from an aqueous system by root absorption and concentration. Water hyacinths demonstrated the ability to remove 0.439 mg of silver, 0.568 mg of cobalt, and 0.544 mg of strontium in an ionized form per gram of dry plant material in a 24-hour period. Alligator weeds removed a maximum of 0.439 mg of silver, 0.130 mg of cobalt, and 0.161 mg of strontium per gram of dry plant material per day. (Author)

**N75-27564/4** PC A02/MF A01  
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.  
**Bio-Conversion of Water Hyacinths into Methane Gas, Part 1.**  
B. C. Wolverton, R. C. McDonald, and J. Gordon. Jul 74, 13p Rept no. NASA-TM-X-72725

Descriptors: \*Plants (Botany), \*Synthane, Cadmium, Fermentation, Nickel, Pollution control.

Bio-gas and methane production from the microbial anaerobic decomposition of water hyacinths (*Eichhornia crassipes*) (Mart) Solms was investigated. These experiments demonstrated the ability of water hyacinths to produce an average of 13.9 ml of methane gas per gram of wet plant weight. This study revealed that sample preparation had no significant effect on bio-gas and/or methane production. Pollution of water hyacinths by two toxic heavy materials, nickel and cadmium, increased the rate of methane production from 51.8 ml/day for non-contaminated plants incubated at 36 C to 81.0 ml/day for Ni-Cd contaminated plants incubated at the same temperature. The methane content of bio-gas evolved from the anaerobic decomposition of Ni-Cd contaminated plants was 91.1 percent as compared to 69.2 percent methane content of bio-gas collected from the fermentation of non-contaminated plants. (Author)

**N75-27567/7** PC A03/MF A01  
Hampton Inst., Va. Dept. of Agriculture.  
**Space and Energy Conservation Housing Prototype Unit Development.**  
Final Report, Apr. - Aug. 1975.  
D. R. Sunshine. Aug 75, 50p Rept no. NASA-CR-143201  
Grant NSG-1162

Descriptors: \*Architecture, \*Energy conservation, \*Prototypes, Buildings, Construction, Construction materials, Energy policy, Solar energy, Urban development.

Construction plans are discussed for a house which will demonstrate the application of advanced technology to minimize energy requirements and to help direct further development in home construction by defining the interaction of integrated energy and water systems with building configuration and construction materials. Housing unit designs are provided and procedures for the analysis of a variety of housing strategies are developed. (Author)

**N75-32591/0** PC A04/MF A01  
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**Flat-Plate Solar-Collector Performance Evaluation with a Solar Simulator as a Basis for Collector Selection and Performance Prediction.**  
F. F. Simon. 1975, 52p Rept nos. NASA-TM-X-71793, E-8470  
Conf-Presented at 1975 Intern. Solar Energy Soc. Meeting, Los Angeles, 28 Jul. - 8 Aug. 1975.

Descriptors: \*Flat plates, \*Performance prediction, \*Solar collectors, \*Solar simulators, Air conditioning, Cost effectiveness, Performance tests, Solar energy conversion, Sunlight, Tables (Data).

The use of a solar simulator for performance determination permits collector testing under standard conditions of wind, ambient temperature, flow rate and sun. The performance results determined with the simulator have been found to be in good agreement with outdoor performance results. The measured thermal efficiency and evaluation of 23 collectors are reported which differ according to absorber material (copper, aluminum, steel), absorber coating (nonselective black paint, selective copper oxide, selective black nickel, selective black chrome), type of glazing material (glass, Tedlar, Lexan, antireflection glass), the use of honeycomb material and the use of vacuum to prevent thermal convection losses. The collectors were given performance rankings based on noon-hour solar conditions and all-day solar conditions. The determination with the simulator of an all-day collector performance was made possible by tests at different incident angles. The solar performance rankings were made based on whether the collector is to be used for pool heating, hot water, absorption air conditioning, heating, or for a solar Rankine machine. (Author)

**N76-10569/1** PC A07/MF A01  
Ohio Agricultural Research and Development Center, Wooster.  
**Grown Organic Matter as a Fuel Raw Material Resource.**  
Final Report.  
W. L. Roller, H. M. Keener, R. D. Kline, H. J. Mederski, and R. B. Curry. Oct 75, 134p Rept no. NASA-CR-2608  
Contract NGL-36-007-001

Descriptors: \*Agriculture, \*Crop growth, \*Earth resources, \*Fuels, \*Organic materials, Cellulose, Cost analysis, Fibers, Food, Photosynthesis, Production management, Solar energy.

An extensive search was made on biomass production from the standpoint of climatic zones, water, nutrients, costs and energy requirements for many species. No exotic species were uncovered that gave hope for a bonanza of biomass production under culture, location, and management markedly different from those of existing agricultural concepts. A simulation analysis of biomass production was carried out for six species using conventional production methods, including their production costs and energy requirements. These estimates were compared with data on food, fiber,



and feed production. The alternative possibility of using residues from food, feed, or lumber was evaluated. It was concluded that great doubt must be cast on the feasibility of producing grown organic matter for fuel, in competition with food, feed, or fiber. The feasibility of collecting residues may be nearer, but the competition for the residues for return to the soil or cellulosic production is formidable. (Author)

**N76-10697/0** **PC A02/MF A01**  
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.  
**Water Hyacinths for Upgrading Sewage Lagoons to Meet Advanced Wastewater Treatment Standards, Part 1.**  
B. C. Wolverton, and R. C. McDonald. Oct 75, 9p Rept no. NASA-TM-X-72729

Descriptors: \*Filtration, \*Plants (Botany), \*Sewage, \*Water treatment, Biochemistry, Chemical analysis, Pollution control.

Water hyacinths, *Eichhornia crassipes* Mart. Solms, have demonstrated the ability to function as an efficient and inexpensive final filtration system in a secondary domestic sewage lagoon during a three month test period. These plants reduced the suspended solids, biochemical oxygen demanding substances, and other chemical parameters to levels below the standards set by the state pollution control agency. The water hyacinth-covered secondary lagoon utilized in this experiment had a surface area of 0.28 hectare (0.70 acre) with a total capacity of 6.8 million liters (1.5 million gallons), receiving an inflow of 522,100 liters (115,000 gallons) per day from a 1.1 hectare (3.8 acre) aerated primary sewage lagoon. These conditions allowed a retention time of 14 to 21 days depending on the water hyacinth evapotranspiration rates. The desired purity of final sewage effluent can be controlled by the water hyacinth surface area, harvest rate, and the retention time. (Author)

**N76-27671/6** **PC A04/MF A01**  
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.  
**An Inexpensive Economical Solar Heating System for Homes.**  
J. W. Allred, J. M. Shinn, Jr, C. E. Kirby, and S. R. Barringer. Jul 76, 59p Rept nos. NASA-TM-X-3294, L-10451

Descriptors: \*Solar heating, Residential areas, Construction materials, Heat exchangers, Installing, Low cost, Pipes (Tubes), Solar collectors, Storage tanks.  
Identifiers: \*Solar space heating, Residential buildings, Instructions.

A low-cost solar home heating system to supplement existing warm-air heating systems is described. The report is written in three parts: (1) a brief background on solar heating, (2) experience with a demonstration system, and (3) information for the homeowner who wishes to construct such a system. Instructions are given for a solar heating installation in which the homeowner supplies all labor necessary to install off-the-shelf components estimated to cost \$2,000. These components, which include solar collector, heat exchanger, water pump, storage tank, piping, and controls to make the system completely automatic, are available at local lumber yards, hardware stores, and plumbing supply stores, and are relatively simple to install. Manufacturers and prices of each component used and a rough cost analysis based on these prices are included. This report also gives performance data obtained from a demonstration system which was built and tested at the Langley Research Center. (Author)

**N76-71498/9** **PC A05/MF A01**  
Comptroller General of the United States, Washington, D.C. Resources and Economic Development Div.  
**Using Solid Waste to Conserve Resources and to Create Energy. Environmental Protection Agency. Report to the Congress**  
27 Feb 75, 79p Rept nos. RED-76-326, B-166506

Descriptors: \*Solid waste disposal, \*Materials recovery, \*Fuels, \*Management planning, Government policies, Reclamation, Regulations, Refuse disposal, Separation, Waste processing, Economic analysis, Metal scrap, Incinerators, Research management.  
Identifiers: \*Waste recycling, Oil wastes, Pyrolysis incineration.

Contents: Resource recovery: What it is and why it is important; Progress in implementing provisions of the resource recovery act has been slow; Major issues confronting resource recovery, recycling, and reuse; Energy recovery from solid waste; The Federal role in assisting States and Localities in establishing resource recovery programs; Scope of review. Portions of this document are not fully legible.

**N77-13537/4** **PC A02/MF A01**  
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**Status of the ERDA/NASA Photovoltaic Tests and Applications Project.**  
J. N. Deyo, H. W. Brandhorst, Jr, and A. F. Forestieri. 18 Nov 76, 10p Rept no. NASA-TM-X-73567  
Conf-Presented to the 12TH Photovoltaic Specialists Conf., 15-18 Nov. 1976; Sponsored by the Inst. Of Electrical and Electronic Engineers.

Descriptors: \*Photovoltaic conversion, \*Silicon, \*Solar arrays, \*Solar energy conversion, Accelerated life tests, Low cost, Marketing, Performance, Solar cells, Technology utilization.

The Tests and Applications Project of the ERDA Photovoltaic Program is concerned with the testing of photovoltaic systems and the growth of their use in real terrestrial applications. This activity is an important complement to the development of low cost solar arrays by providing requirements based on application needs and stimulating markets to create demand to absorb increasing production capacity. A photovoltaic system test facility is now operational, market stimulation has been initiated through applications, and standards for terrestrial cell measurements established.

**N77-18954/6** **PC A15/MF A01**  
California Univ., Berkeley.  
**They Watch and Wonder. Public Attitudes Toward Advanced Technology.**  
Final Report.  
T. Laporte, and D. Metlay. Dec 75, 344p Rept no. NASA-CR-149673  
Contract NGR-05-003-0471

Descriptors: \*Data acquisition, \*Public relations, \*Research and development, \*Social factors, \*Technology transfer, Air transportation, Human tolerances, Land use, Rural areas, Tables (Data).  
Identifiers: Communities, Surveys.

The relationship of technological development to individual and community response was investigated to provide a general conceptual, as well as empirical basis, for an understanding of the impact of advanced technologies on social life. Results of the surveys are presented in tables and graphs.

**N77-19729/1** **PC A02/MF A01**  
Alcorn State Univ., Lorman, Miss. Dept. of Biological Sciences.  
**Bio-Gas Production from Alligator Weeds.**  
Semiannual Report.  
A. Latif. 1 Jun 76, 11p Rept no. NASA-CR-149809  
Grant NSG-8036

Descriptors: \*Biodegradation, \*Fermentation, \*Methane, Plants (Botany), Anaerobes, Bacteria, Luminous intensity, Metabolic wastes, pH, Temperature effects.  
Identifiers: Reducing agents, Aquatic weeds, \*Alligator weed, \*Alternanthera philoxeroides.

Laboratory experiments were conducted to study the effect of temperature, sample preparation, reducing agents, light intensity and pH of the media, on bio-gas and methane production from the microbial anaerobic decomposition of alligator weeds (*Alternanthera philoxeroides*). Efforts were

also made for the isolation and characterization of the methanogenic bacteria.

**N77-32589/2** **PC A03**  
Laboratoires d'Electronique et de Physique Appliquee, Paris Limeil-Brevannes (France).  
**Installation in Dakar of a Pump Powered by Solar Cell Panels. Mise en Place a Dakar d'Une Pompe Alimentee Par des Panneaux de Cellules Solaires.**  
Final Report.  
C. J. Naaijer. Jun 76, 44p  
Contract DGRST-75-7-1302  
Language in French.

Descriptors: \*Hydraulic equipment, \*Pumps, Energy conversion efficiency, Solar cells, Automation, Constraints, Optimization, Photovoltaic cells.  
Identifiers: \*Solar water pumps.

The installation of a solar-powered water pumping system in Dakar (Franch Sahara) is described. The interrelation of the various constraints is detailed together with the reasons for choosing photovoltaic cells. The solar collector pump, engine, buffer battery, and control unit are discussed. The functional characteristics for the automation of the system is elaborated upon.

**N77-33683/2** **PC A04/MF A01**  
Battelle Columbus Labs., Ohio.  
**Review of Current Interest and Research in Water Hyacinth-Based Wastewater Treatment.**  
Final Report.  
R. K. Markarian, J. E. Balon, and A. C. Robinson. Feb 77, 59p Rept nos. NASA-CR-155150, BCL-OA-TFR-77-1  
Contract NASW-2800

Descriptors: \*Sewage treatment, \*Water pollution, Aquaculture, Industrial wastes, Solid wastes.  
Identifiers: Aquatic weeds, Interviews, \*Water hyacinth.

The status of activity in the user community for water hyacinth-based wastewater treatment was evaluated. The principal technique used was that of interviewing people who either (1) were known to be engaged in hyacinth research or development or (2) had made inquiry to NASA about hyacinth systems. About 40 non-research organizations and a similar number of research organizations were contacted. As a result of the interviews and a review of the relevant literature, it was concluded that hyacinth systems have the potential for providing a lower cost way for small cities to meet increasingly stringent effluent requirements. A limited amount of full-scale demonstration of hyacinth systems has been carried out during the past two years, but the yield of design data has been small. Several organizations are currently planning construction of experimental full-scale hyacinth-based wastewater treatment systems during 1977-1978.

**N78-10603/6** **PC A02/MF A01**  
International Atomic Energy Agency, Vienna (Austria).  
**Energy in Developing Countries: Prospects and Problems.**  
V. Baum. 1977, 17p Rept nos. IAEA-CN-36/581, CONF-770505-235  
Conf-Presented at Nucl. Power and Its Fuel Cycles, Salzburg, Austria, 2 May 1977.

Descriptors: \*Energy policy, Developing nations, Energy consumption, Economics, Management planning, Social factors.  
Identifiers: \*Developing countries, Energy requirements, \*Energy demand.

Requirements for primary energy and electric power in the developing countries are analyzed in the light of projections of population and economic growth, the availability of indigenous energy resources, and input requirements (capital, technology, trained personnel) for accelerated energy development. Possible supplies for such inputs from domestic sources, transnational corporations, multilateral institutions, and through co-operation among the developing countries themselves and between the developing and the developed countries are reviewed.



# APPROPRIATE TECHNOLOGY ABSTRACTS

**N78-11653/0** PC A07/MF A01  
World Meteorological Organization, Geneva (Switzerland).  
**Guidelines for Disaster Prevention and Preparedness in Tropical Cyclone Areas.**  
1977, 135p  
Subm-Prepared Jointly with Econ. And Social Comm. For Asia and the Pacific and League of Red Cross Soc.

Descriptors: \*Cyclones, \*Weather forecasting, Preparation, Prevention, Disasters, Floods, Land use, Storm damage, Tropical storms, Warning systems.  
Identifiers: Switzerland.

Following a general introduction and background information, forecasts and warnings of tropical cyclones, river floods, and storm surges are reviewed. The role of disaster prevention in national planning is discussed together with legislation for disaster prevention, risk evaluation, land use, and zoning and building codes. Planning and legislation for disaster preparedness are summarized along with aspects such as tropical cyclone warning systems, flood fighting, evacuation of danger areas, public education and information, and test exercises and emergency operations. Finally, disaster rehabilitation and resettlement and assessment of damage are discussed.

**N78-17466/1** PC A03/MF A01  
National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.  
**Wind Turbine Generator Rotor Blade Concepts with Low Cost Potential.**  
T. L. Sullivan, T. P. Cahill, D. G. Griffie, Jr., and H. W. Gewehr. Dec 77, 38p Rept nos. NASA-TM-73835, DOE/NASA-1028-77/13  
Contract E(49-26)-1028  
Conf-to Be Presented at the 23RD Natl. Sampe Symp., Anaheim, Calif., 2-4 May 1978.

Descriptors: \*Rotor blades (Turbomachinery), \*Turbine blades, Low cost, Product development, Turbogenerators, Windpowered generators.  
Identifiers: \*Wind turbines.

Four processed for producing blades are examined. Two use filament winding techniques and two involve filling a mold or form to produce all or part of a blade. The processes are described and a comparison is made of cost, material properties, design and free vibration characteristics. Conclusions are made regarding the feasibility of each process to produce low cost, structurally adequate blades.

**N78-19616/9** PC A13/MF A01  
National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.  
**Wind Turbine Structural Dynamics.**  
D. R. Miller. 1978, 280p Rept nos. NASA-CP-2034, DOE-CONF-771148  
Conf-Workshop Held at Cleveland. 15-17 Nov. 1977; Sponsored by Doe.

Descriptors: \*Mechanical drives, \*Turbines, \*Windpowered generators, Dynamic loads, Dynamic structural analysis, Energy conversion, Low cost, Stability derivatives, Vibrational stress, Windpower utilization.  
Identifiers: \*Wind turbines.

For abstract, see STAR 1610

**N78-24698/0** PC A04/MF A01  
United Nations Educational, Scientific and Cultural Organization, Paris (France).  
**Regional Meeting of Experts on Environmental Education in Asia.**  
International Environmental Education Programme - UNESCO-UNEP. Final Report.  
10 Feb 77, 73p Rept no. UNESCO-ED-77/WS/22  
Conf-Conf. Held at Bangkok, 15-20 Nov. 1976.

Descriptors: \*Asia, \*Earth environment, \*Education, Ecology, Economic factors, Environment management, Environment protection, Qualifications, Social factors, United Nations, Universities.

Following a description of the environmental situation in Asia, the need and basis for environmental

education is discussed. Problems and activities in environmental education in Asia are reviewed and features for improving it are presented.

**N78-24699/8** PC A04/MF A01  
United Nations Educational, Scientific and Cultural Organization, Paris (France).  
**Regional Meeting of Experts on Environmental Education in Latin America and the Caribbean.**  
International Environmental Education Programme - UNESCO-UNEP Final Report.  
1 Mar 77, 57p  
Subm-Sponsored by Konrad Adenauer Found. Conf-Conf. Held at Bogota, 24-30 Nov. 1976.

Descriptors: \*Earth environment, \*Education, \*South America, Caribbean Sea, Ecology, Economic factors, Environment management, Environment protection, Qualifications, Social factors, United Nations, Universities.  
Identifiers: Caribbean Sea Islands, \*Meetings.

The background and objectives of the meeting are outlined followed by discussions on environmental education in the context of ecodevelopment and life-long education in Latin America. The present state of environmental education and the educational systems in Latin America are reviewed and strategies to introduce and develop environmental education at regional and national levels in Latin America are presented.

**N78-25012/3** PC A03/MF A01  
National Aeronautics and Space Administration, Washington, D.C.  
**Waste Heat Utilization in Industrial Processes.**  
M. Weichsel, and W. Heitmann. Apr 78, 35p Rept no. NASA-TM-75210  
Contract NASW-2791

Descriptors: \*Cooling systems, \*Heat exchangers, \*Heat pumps, Economic development, Industrial plants, Waste energy utilization.  
Identifiers: Translations, \*Waste heat utilization, West Germany.

A survey is given of new developments in heat exchangers and heat pumps. With respect to practical applications, internal criteria for plant operation are discussed. Possibilities of government support are pointed out. Waste heat steam generators and waste heat aggregates for hot water generation or in some cases for steam superheating are used. The possibilities of utilization can be classified according to the economic improvements and according to their process applications, for example, gas cooling. Examples are presented for a large variety of applications.

**N78-25998/3** PC A02/MF A01  
National Inst. for Water Research, Pretoria (South Africa).  
**Comparative Reclamation of Potable Water from Biofilter and Activated Sludge Effluents at the Stander Water Reclamation Plant.**  
S. H. V. Vanblerk, J. Prinsloo, and J. Vanleeuwen. 1977, 9p  
Conf-Presented at the Intern. Conf. On Advan. Treat. And Reclamation of Wastewater.

Descriptors: \*Activated sludge, \*Water treatment, Water reclamation, Calcium oxides, Fluid filters, Industrial plants.  
Identifiers: \*Sewage treatment, Physical chemical treatment, Activated sludge treatment, South Africa.

The reclamation of water from biofilter humus tank effluent and activated sludge effluent by a physical-chemical process was studied at a 4,500 cu m d/1 water reclamation plant. Lime clarification followed by quality equalization, ammonia stripping, recarbonation, sand filtration, chlorination, active carbon adsorption, and chemical stabilization produced a high quality potable water from humus tank effluent. Water was reclaimed from activated sludge effluent utilizing the same process without quality equalization and ammonia stripping. The simplified process was easier to control and rendered a product water of comparable quality. In processing activated sludge effluent, consumption of chemicals was less and reclamation costs were

reduced by 20 to 30%, depending on the size of the plant.

**N78-27522/9** PC A09/MF A01  
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.  
**Proceedings of the Alternate Energy Systems Seminar.**  
30 Mar 78, 184p Rept nos. NASA-CR-157255, JPL-PUB-78-45  
Contract NAS7-100  
Subm-Sponsored in Part by Doe. Conf-Seminar Held at Pasadena, Calif., 30 Mar. 1978; Sponsored by Doe.

Descriptors: \*Clean energy, \*Communicating, \*Energy conversion, \*Solar energy, \*Technology transfer, \*Thermal energy, Earth resources, Energy conservation, Solar cooling, Solar heating, Systems engineering, Windpower utilization.  
Identifiers: \*Meetings, Proceedings.

For abstract, see STAR 1618

**N78-29578/9** PC A02/MF A01  
National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.  
**Utilization of Solar Energy in Developing Countries: Identifying Some Potential Markets.**  
G. F. Hein, and T. A. Siddiqi. Feb 78, 13p Rept nos. NASA-TM-78964, DOE/NASA/1022-78/41  
Contract E(49-28)-1022  
Conf-Presented at the Ann. Meeting of the AM. Assoc. For the Advan. Of Sci., Washington, D.C., 12-17 Feb. 1978.

Descriptors: \*Developing nations, \*Energy technology, \*Marketing, Solar energy, Economic factors, Electricity, Haiti, Photovoltaic cells, Solar generators, Technology utilization.  
Identifiers: Developing countries, \*Photovoltaic conversion.

The potential use of solar electricity generated from photovoltaic cells is examined for nineteen developing nations. Energy and economic profiles are summarized for each country. A comparison is made between the use of autogeneration and photovoltaics in a rural area of Haiti.

**N78-31532/2** PC A05/MF A01  
Honeywell, Inc., Minneapolis, Minn.  
**Solar Heating and Cooling Systems Design and Development.**  
Quarterly Report, 1 Apr. 1977 - 30 Jun. 1977.  
Jul 77, 88p Rept nos. NASA-CR-150770, QR-4  
Contract NAS8-32093  
Subm-Prepared by Doe.

Descriptors: \*Buildings, \*Solar cooling, \*Solar heating, Systems engineering, Energy sources, Product development, Prototypes, Solar energy conversion, Technology assessment.  
Identifiers: Solar heating systems, Solar cooling systems, Residential buildings, Commercial buildings.

The development of twelve prototype solar heating/cooling systems, six heating and six heating and cooling systems, two each for single family, multi-family, and commercial applications, is reported. Schedules and technical discussions, along with illustrations on the progress made from April 1, 1977 through June 30, 1977 are detailed.

**N78-31538/9** PC A02/MF A01  
Solar Engineering and Mfg. Co., Ft. Lauderdale, Fla.  
**Design Data Brochure: Solar Hot Water System.**  
Jul 78, 21p Rept no. NASA-CR-150699  
Contract NAS8-32247  
Subm-Prepared for Doe.

Descriptors: \*Buildings, \*Solar heating, Systems engineering, Water, Energy sources, Energy technology, Solar collectors, Solar energy conversion, Tables (Data).  
Identifiers: \*Solar water heaters, Hot water heating, Solar water heating.

A design calculation is detailed for a single-family residence housing a family of four in a nonspecific



geographical area. The solar water heater system is designed to provide 80 gallons of 140 F hot water per day.

**N78-32546/1** PC A02/MF A01  
Honeywell, Inc., Minneapolis, Minn. Energy Resource Center.  
**Solar Heating and Cooling Systems Design and Development.**  
Jul 78, 22p Rept no. NASA-CR-150786  
Contract NAS8-32093  
Subm-Prepared for Doe.

Descriptors: \*Cooling systems, \*Solar heating, Research and development, Solar energy, Energy sources, Prototypes, Solar energy conversion.  
Identifiers: Solar heating systems, Solar cooling systems, Prototypes.

The development and delivery of prototype solar heating and cooling systems for installation and operational test are detailed.

**N79-15411/8** PC A02/MF A01  
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.  
**Photovoltaic Power Systems for Rural Areas of Developing Countries.**  
L. Rosenblum, W. J. Bifano, G. F. Hein, and A. F. Ratajczak. 1979, 19p Rept nos. NASA-TM-79097, E-9921  
Conf-Presented at the Intern. Seminar on Solar Energy, Tokyo, 5-10 Feb. 1979; Sponsored by the United Nations and Govt. Of Japan.

Descriptors: \*Developing nations, \*Photovoltaic conversion, \*Rural areas, Technology utilization, Utilities, Arizona, Cost effectiveness, Educational television, Industries, Solar cells, Upper Volta.  
Identifiers: Developing countries, \*Electric power generation.

Systems technology, reliability, and present and projected costs of photovoltaic systems are discussed using data derived from NASA, Lewis Research Center experience with photovoltaic systems deployed with a variety of users. Operating systems in two villages, one in Upper Volta and the other in southwestern Arizona are described. Energy cost comparisons are presented for photovoltaic systems versus alternative energy sources. Based on present system technology, reliability, and costs, photovoltaics provides a realistic energy option for developing nations.

**N79-16377/0** PC A10/MF A01  
Burns and McDonnell, Kansas City, MO.  
**Assessment of the Potential of Solar Thermal Small Power Systems in Small Utilities.**  
Final Report.  
P. Steitz, L. G. Mayo, and S. P. Perkins, Jr. Nov 78, 222p Rept nos. NASA-CR-158093, JPL-1060-14  
Contract JPL-954971  
Subm-Prepared for JPL and Doe.

Descriptors: \*Economic factors, \*Solar generators, Utilities, Concentrators, Parabolic antennas, Rankine cycle, Solar energy conversion.  
Identifiers: Electric power plants, Solar thermal power plants, Tower focus power plants, Assessments, Economic analysis.

The potential economic benefit of small solar thermal electric power systems to small municipal and rural electric utilities is assessed. Five different solar thermal small power system configurations were considered in three different solar thermal technologies. The configurations included: (1) 1 MW, 2 MW, and 10 MW parabolic dish concentrators with a 15 kW heat engine mounted at the focal point of each dish, these systems utilized advanced battery energy storage; (2) a 10 MW system with variable slat concentrators and central steam Rankine energy conversion, this system utilized sensible thermal energy storage; and (3) a 50 MW central receiver system consisting of a field of heliostats concentrating energy on a tower-mounted receiver and a central steam Rankine conversion system, this system also utilized sensible thermal storage. The results are summarized in terms of break-even capital costs. The break-even capital cost was defined as the solar thermal plant cap-

ital cost which would have to be achieved in order for the solar thermal plants to penetrate 10 percent of the reference small utility generation mix by the year 2000. The calculated break-even capital costs are presented.

**N79-18460/2** PC A03/MF A01  
Bundesministerium fuer Wissenschaft und Forschung, Vienna (Austria).  
**Austrian 10KWE Solar Power Plant. A Project of the Federal Ministry for Science and Research.**  
1977, 28p

Descriptors: \*Electric power plants, \*Solar energy conversion, Austria, Energy technology, Structural engineering, Technology assessment, Electric generators, Electric networks, Energy storage, Solar collectors, Systems engineering, Working fluids.  
Identifiers: \*Solar power plants, Developing countries, Heat storage.

Concepts under development in other nations were surveyed to clarify available options in the design and construction of a small solar energy plant suitable for use in developing countries. The possibility of marketing an Austrian-made power plant capable of operating without human service was assessed as well as the possibility of supplying single components to users. Aspects of the design under consideration discussed include collector circuits, freon circuits, prime movers, generator and electric networks, plant performance, and thermal storage.

**ORNL-tr-4587** PC A02/MF A01  
**Development of Bivalves Belonging to the Genus Corbicula**  
I. Miyazaki. 1936, 9p  
Contract W-7405-ENG-26  
Translated by H. Kubota from Nippon Suisan Gakkaishi 5 n4 p249-254 1936.

Descriptors: \*Japan, \*Molluscs, \*Aquaculture, Aquatic ecosystems, Food, Reproduction.  
Identifiers: ERDA/520100, Translations, Japan.

Small bivalves of the genus Corbicula are widely used for human food in Japan thus they have some commercial importance, and in some cases they are the object of cultivation being transplanted to the place where they are not found. Their habitat is either fresh or brackish water. The chief purpose of the present study is to elucidate their reproduction which shows different types according to ecological conditions. (ERA citation 03:031852)

**ORNL-5024** PC A07/MF A01  
Oak Ridge National Lab., Tenn.  
**Assessment of the Environmental Impact of Alternative Energy Sources.**  
S. E. Beall, I. Spiewak, H. G. Arnold, H. W. McLain, and E. S. Bettis. Sep 74, 134p  
Contract W-7405-eng-26

Descriptors: \*Geothermal energy, \*Environmental effects, \*Solar energy, Environmental effects, \*Thermonuclear reactors, Environmental effects, \*Energy sources, Environmental effects, Environment.  
Identifiers: ERDA/295500, ERDA/293500, ERDA/140400, ERDA/150600, ERDA/700200.

Several energy sources, including solar, geothermal, and fusion processes, have been presented in the press as being low-cost and nonpolluting and proclaimed as solutions to the energy crisis. This report provides information related to technical feasibility, economic practicality, and commercial availability of these sources, and attempts to assess their environmental effects. Specifically, three concepts of geothermal energy extraction, artificial and natural means of collecting solar energy, and a typical thermonuclear energy generator are discussed. The authors point out that this report was prepared during the Summer and Fall of 1973, but was not completed because funding for the project was canceled early in 1974. Although the work was completed by one of the authors (Beall) on a part-time basis early in 1975, there was no time to update the material to reflect the

changes in technology during the interim; thus, much of the referenced technological material and cost data are somewhat out of date. In spite of this shortcoming, Dr. Beall feels that the treatment of environmental effects and the suggested methodology for comparing the impacts of the alternative energy systems remain pertinent and provide a basis for additional generic and site-specific studies. (146 references).

**ORO-5422-1** PC A02/MF A01  
Center for Energy and Environment Research, Mayaguez, Puerto Rico.  
**Production of Sugarcane and Tropical Grasses as a Renewable Energy Source. First Quarterly Report, June 1--August 31, 1977**  
A. G. Alexander. 1977, 24p  
Contract EG-77-G-05-5422

Descriptors: \*Sugar cane, Grass, Chemical analysis, Evaluation, Phosphorus, Plant breeding, Plant growth, Plant tissues, Potassium, Preferred species, Production, Puerto Rico, Silicon, Sodium, Sulfur, Tropical regions, Vegetative propagation.  
Identifiers: ERDA/140504, ERDA/553000, \*Forage crops, \*Forage grasses.

Research was initiated on the intensive production of sugarcane and other tropical grasses as solar-dried forages. Greenhouse experiments designed to screen candidate clones and to evaluate growth curves were the first to get underway. Chemical growth control tests were also initiated. Plant materials at this stage consist of commercial sugarcane hybrids, progeny from the AES-UPR cane breeding program, Saccharum clones from the species officinarum, spontaneum, sinense, and robustum, Erianthus clones, a commercial tropical forage grass, napier grass, and forms of S. spontaneum plus Arundo donax growing wild in Puerto Rico. Initial stages of cane breeding and progeny selection for the high tonnage attribute were begun during August. Foliar tissue analyses for N, P, K, S, and Si were started together-with assays for acid invertase and other components of expanding stem tissue. The first field experiment was initiated during July at the semi-arid Lajas Substation. Four clones (three sugarcane hybrids plus napier grass var. Merker) are being evaluated incident to row spacing and harvest frequency in field-plots. (ERA citation 04:005503)

**ORO-5422-3** PC A04/MF A01  
Center for Energy and Environment Research, Rio Piedras, PR.  
**Production of Sugarcane and Tropical Grasses as a Renewable Energy Source. Third Quarterly Report, December 1, 1977--February 28, 1978**  
1978, 55  
Contract EG-77-G-05-5422

Descriptors: \*Grass, \*Sugarcane, Cultivation techniques, Diagrams, Evaluation, Forage, Plant breeding, Plant growth, Production, Productivity, Tables, Tropical regions, Yields.  
Identifiers: ERDA/140504, Puerto Rico, Biomass, Refuse derived fuels, Manufactured gas, Synthetic fuels, Solid wastes.

Tropical grasses from Saccharum and related genera are being evaluated as candidates for intensive production of solar-dried biomass. Categories of candidate grasses include short, intermediate, and long-rotation crops for co-production with conventional food commodities. The hybrid forage grass Sordan 70A (Northrup King Seeds) is the outstanding short-rotation plant tested to date. Napier grass (var. Common Merker) is a promising intermediate-rotation crop which possibly may be exceeded by several napier grass hybrids. Candidate clones from the Saccharum species sinense and spontaneum are being investigated for use in both long-rotation and minimum-tillage production regimes. Direct comparisons of sugarcane hybrids with napier grass indicate that sugarcane is an inferior candidate for tropical forage production. Sugarcane responded well to narrow row centers at 2 months but the response diminished at 4 and 6 months. For both crops, greater biomass yields were obtained from a single harvest at 6 months than from three 2-month harvests combined. The ability to convert early succulent growth to dry matter is a decisive feature for candidates to be



handled as frequently-recut forages. Progress has been made in chemical growth regulation studies. A series of intergeneric hybrid clones are being imported for evaluation as biomass sources. Limited progress was made in biomass candidate breeding. A revised work plan for year 2 is discussed. (ERA citation 04:018340)

**PAT-APPL-566 493** PC A02/MF A01  
National Aeronautics and Space Administration, Pasadena Office, Calif.  
**Solar Powered Pump.**  
Patent Application.  
C. C. Kirsten. Filed 9 Apr 75, 19p N75-22746/2, NASA-CASE-NPO-13567-1  
Contract NAS7-100  
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: \*Arid lands, \*Farm crops, \*Irrigation, \*Pumps, \*Water flow, \*Patent applications, Low cost, Solar energy.

A low cost water pump suitable for use in agricultural irrigation in underdeveloped regions is disclosed. The pump is adopted to use unconcentrated sunlight as a source of energy and atmospheric air as a working fluid for intermittently delivering a stream of water from a given source.

**PAT-APPL-598 969** PC A04/MF A01  
National Aeronautics and Space Administration, Pasadena Office, Calif.  
**Low Cost Solar Energy Collection System.**  
Patent Application.  
C. G. Miller, and J. B. Stephens. Filed 24 Jul 75, 57p N75-28519/7, NASA-CASE-NPO-13579-1  
Contract NAS7-100  
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: \*Cost reduction, \*Solar energy absorbers, \*Solar reflectors, \*Patent applications, Equipment specifications, Pipes (Tubes), Product development.

A fixed, linear, ground-based primary reflector is described which has an extended curved-sawtooth contoured surface covered with a metallized polymeric reflecting material; It reflects solar energy to a movably supported collector that is kept at the concentrated line focus of the reflector primary. The primary reflector was constructed by a process utilizing freeway paving machinery. The solar energy absorber is preferably a fluid-transporting pipe. Efficient utilization leading to high temperatures from the reflected solar energy was obtained by cylindrical shaped secondary reflectors that direct off-angle energy to the absorber pipe. Refocusing secondary reflectors which cause a series of discrete spots of highly concentrated solar energy to fall on the fluid-transporting pipe were used to obtain higher temperature levels. A seriatim arrangement of cylindrical secondary reflector stages and spot-forming reflector stages produces a high temperature solar energy collection system of greater efficiency.

**PAT-APPL-617 202** PC A03/MF A01  
National Aeronautics and Space Administration, Pasadena Office, Calif.  
**Lightweight Reflector Assembly and Method.**  
Patent Application.  
M. J. Argoud, J. Jolley, and W. L. Walker. Filed 24 Sep 75, 29p N75-32894/8, NASA-CASE-NPO-13707-1  
Contract NAS7-100  
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: \*Fabrication, \*Low cost, \*Solar reflectors, \*Patent applications, Glass, Parabolic reflectors, Substrates.

An invention for a lightweight solar reflector assembly having a glass cellular substrate and a method of forming the reflector assembly was described. The novelty of the invention appears to reside in the method of forming a large low cost reflective surface for use in a solar concentrator or antenna. The invention also includes the reflective component combination of a lamina glass reflective surface and a lightweight cellular glass sub-

strate having the same coefficient of thermal expansion to provide a high quality optical reflective surface. (Author)

**PAT-APPL-789 375** PC A02/MF A01  
Department of Agriculture, Washington, D.C.  
**Nutritionally Balanced Protein Snack Food Prepared from Legume Seeds**  
Patent Application  
Louis B. Rockland, and Thomas M. Radke. Filed 20 Apr 77, 15p PB-267 049/5  
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Descriptors: \*Patent applications, \*Food processing, \*Leguminous plants, \*Seeds, Nutrition, Proteins.  
Identifiers: Procedures.

Novel food products are prepared from legume seeds by (a) treating the seeds to render them quick-cooking, (b) cooking the seeds and mashing them, (c) combining the cooked and mashed seeds with methionine-containing ingredients such as cereal grain flours, oil seeds, oil seed flours, and the like, (d) adding water to the mixture to form a dough, (e) extruding the dough into sheets, (f) cutting the sheets into pieces, and (g) frying the pieces in edible oil.

**PAT-APPL-932 080** PC A02/MF A01  
Department of Agriculture, Washington, DC.  
**Precooked Baking Potatoes**  
Patent Application  
Keng C. Ng, Merle L. Weaver, Masahide Nonaka, and Robert N. Sayre. Filed 8 Aug 78, 22p PB-287 463/4  
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Descriptors: \*Patent applications, \*Potatoes, \*Food processing, Vegetables.

The patent application discloses a process wherein raw potatoes are cooked under controlled conditions. The potatoes are cooked to their centers without damage to their surface tissue. An important feature of the cooking is that the temperature thereof for a part of the time, be above the temperature at which sloughing of the potato surface would occur if the potatoes were cooked to their centers at that temperature. Following the cooking procedure the potatoes are heated in air and then frozen or chilled to preserve them. (Portions of this document are not fully legible)

**PAT-APPL-934 290** PC A02/MF A01  
Department of Agriculture, Washington, DC.  
**High-Performance, Lightweight Structural Particleboard**  
Patent Application  
M. O. Hunt, W. F. Lehmann, and D. A. Fergus. Filed 17 Aug 78, 17p PB-287 465/9  
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Descriptors: \*Wood particle boards, \*Patent applications, Particulate composites, Panels, Construction materials, Hardwoods, Composite fabrication, Sandwich panels, Particles, Alignment, Hot pressing.

Alined wood particles and an adhesive binder comprise the faces of a sandwiched, laminate-like structure formed in a one-step pressing and heating operation, the interior of which is made of randomly oriented wood particles and an adhesive binder, exhibiting lighter weight and greater bending strength than known particleboards constructed from heavy hardwoods such as red oak.

**PATENT-3 331 356** Not available NTIS  
Department of the Interior, Washington, D.C.  
**Sterilization of Fish in their Aquatic Environment to Produce Maximum Size and Weight per Unit of Water Surface**  
Patent  
Benjamin Eckstein. Filed 22 Nov 65, patented 18 Jul 67, 2p PB-228 200/2, PAT-APPL-519 820

Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 \$0.50.

Descriptors: \*Fishes, \*Sterilization, \*Patents, \*Sterility, Weight(Mass), Size determination, Growth, Brackish water, Aquaculture, Estrogens, Mortality.  
Identifiers: PAT-CL-119-3, Tilapia, Fish sterilization, GPINT.

The invention relates to a method for sterilizing fish, especially Tilapia. In particular, the method comprises the gonadal destruction of Tilapia fry at an age of about four to eight weeks by introducing into water containing the fry an estrogenic composition in small concentrations.

**PATENT-3 984 266** Not available NTIS  
Department of the Navy Washington D C  
**Process for Bonding a Ferro-Cement Structure with Fiberglass Reinforced Plastic**  
Patent  
Kenneth A. Christensen, and Robert B. Williamson. Filed 22 Apr 74, patented 5 Oct 76, 5p AD-D003 818/2, PAT-APPL-462 827  
Supersedes PAT-APPL-462 827-74, AD-D001 591.  
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, D. C. 20231. \$0.50.

Descriptors: \*Patents, \*Adhesive bonding, \*Cements, \*Glass reinforced plastics, Bonding, Adhesives, Fiberglass, Construction materials, Hulls(Marine).  
Identifiers: PAT-CL-156-3, Ferrocement.

A process is described for bonding a glass fiber reinforced plastic to a ferro-cement structure to improve impact strength of the ferro-cement structure, comprising the steps curing the ferro-cement mortar; acid etching the mortar on the side of the ferro-cement mortar to which the glass fiber reinforced plastic is to be bonded, rinsing the mortar, drying the mortar, applying a coat of adhesive to the mortar and attaching the glass fiber reinforced plastic to the bonded mortar surface. The adhesive may be partially cured if desired. (Author)

**PATENT-4 035 065** Not available NTIS  
National Aeronautics and Space Administration, Pasadena Office, Calif.  
**Lightweight Reflector Assembly.**  
Patent  
M. J. Argoud, J. Jolley, and W. L. Walker. Filed 24 Sep 75, patented 12 Jul 77, 9p N77-28933/8  
Supersedes PAT-APPL-617 202-75, N75-32894.  
Subm-Sponsored by NASA.  
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 \$0.50.

Descriptors: \*Fabrication, \*Solar reflectors, \*Paraboloid mirrors, \*Patents, Optical reflection, Structural design, Composite structures, Glass, Coatings, Low cost.  
Identifiers: PAT-CL-350-310.

An inexpensive, lightweight reflective assembly member having good optical quality is described. It is adaptable to accommodating temperature variations without providing destructive thermal stresses and reflective slope errors. The reflective assembly consists of a thin sheet of glass with appropriate reflective coating and a cellular glass block substrate bonded together. The method of fabrication includes abrading the cellular substrate with an abrasive master die to form an appropriate concave surface. An adhesive is applied to the abraded surface and a lamina reflective surface is placed under a uniform pressure to conform the reflective surface onto the desired abraded surface of the substrate.

**PATENT-4 065 053** Not available NTIS  
National Aeronautics and Space Administration, Pasadena, Calif.  
**Low Cost Solar Energy Collection System.**  
Patent



C. G. Miller, and J. B. Stephans. Filed 24 Jul 75, patented 27 Dec 77, 26p N78-17460/4, PAT-APPL-598 969

This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 \$0.50.

Descriptors: \*Solar collectors, \*Solar energy absorbers, \*Patents, Cost analysis, Equipment specifications, Pipes (Tubes), Product development. Identifiers: PAT-CL-237-1, Solar reflectors.

A fixed, linear, ground-based primary reflector having an extended, curved sawtooth contoured surface covered with a metallized polymeric reflecting material, reflected solar energy to a movably supported collector that was kept at the concentrated line focus of the reflector primary. Efficient utilization leading to high temperatures from the reflected solar energy was obtained by cylindrical shaped secondary reflectors that directed off-angle energy to the absorber pipe.

**PATENT-4 103 547** Not available NTIS  
Department of Transportation, Washington, DC.  
**Locomotive Track Curvature Indicator**  
Patent

Joseph D. Vrabel. Filed 7 Feb 77, patented 1 Aug 78, 6p PB-287 466/7, PAT-APPL-765 876  
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 \$0.50.

Descriptors: \*Railroad tracks, \*Curvature, \*Indicating instruments, \*Patents, Display systems, Detectors, Safety, Potentiometers(Instruments). Identifiers: PAT-CL-73-146.

The patent describes a system for dynamically measuring and displaying track curvature information to a locomotive engineer on a real-time basis. A car mounted sensor produces a variable output responsive to changes in the car's orientation caused by variation in track curvature, a control circuit converts the sensor output into an electrical signal representative of the changes in orientation, and an indicator receives the signal and provides a dynamic display of the derived track curvature information. In a preferred embodiment, the sensor comprises an extendable line having one end attached to a bracket that is connected to the center of a supporting truck cross-frame, while the other end is wound on a retractable supply reel mounted on the car's frame. In response to relative movement between the car's frame and the supporting truck, caused by movement of the car over curved track, the length of the line withdrawn from the reel varies and is monitored by an electrical potentiometer that produces an output signal indicative of track curvature.

**PB-169 304** **PC A02 MF A01**  
Forest Products Lab., Madison, Wis.  
**Condensation in Farm Buildings.**  
Research note.  
Jan 66, 9p Rept no. FPL-0114  
Contract  
Revision of Report no. 1186.

Descriptors: \*Buildings, Condensation, \*Condensation, Control, \*Water vapor, Buildings, Rural areas, Moisture, Humidity, Ventilation, Moisture-proofing, Permeability.

The method of controlling or preventing the condensation in farm buildings and other structures involves a particular set of conditions, each of which must be considered separately. A review of the principles of water vapor and condensation is provided for the purpose of establishing a basis for analyzing the problem. The control of factors contributing to condensation by means of ventilation, vapor-permeable constructions, and vapor barriers is discussed.

**PB-169 744** **PC A05 MF A01**  
Maine Dept. of Economic Development, Augusta.  
**Technical and Economic Feasibility of Establishing a Lightweight Aggregate Plant Using Marine Clays in York County, Maine.**  
Final rept.

Jul 64, 78p Rept no.  
Contract Cc-6021

Descriptors: \*Economics, Maine, \*Clay, Maine, \*Composite materials, Clay, \*Industrial production, Composite materials, \*Industrial plants, Maine, Mixtures, Pellets, Concrete, Manufacturing methods, Clay minerals, Feldspar, Quartz, Mica, Potassium compounds, Cements, Commerce, Natural resources, Transportation, Extrusion, Sintering, Feasibility studies, Mining engineering, Industries, Driers(Apparatus), Crushers, Storage, Costs, Structural properties.

Identifiers: Area redevelopment, Aggregates(Materials).

Contents: Raw material resource investigation; Analysis and pilot plant tests; Estimates of construction and production costs, Economic feasibility of lightweight aggregate operation.

**PB-170 306** **PC A10 MF A01**  
American Scientific Corp., Alexandria, Va.  
**Creating a Ceramics Industry on the Blackfeet Reservation.**  
Emmett F. Deady, Saul S. Geftter, Natalie Marra, and Robert F. Custard. Sep 65, 203p  
Contract EDA-14-20-0650-1379

Descriptors: \*Economics, Montana, \*Montana, Industries, \*Industries, Ceramic materials, Feasibility studies, Labor, Commerce, Employment, Management engineering. Identifiers: Ceramics industry, Indian reservations, Area redevelopment.

The study reports that there exists at the Blackfeet Reservation a sufficient labor pool endowed with ceramic production capabilities and that all other factors controlling the success of such an industry are in evidence, provided the enterprise can be financed. It resolves that the plant should be directed to the production of art pottery, particularly fine figurines and pottery designed to reflect the American Indian tradition. It determined that the optimum method of production is slip casting but recommends flexible molding as soon as practical and suggests lines of experiments so directed. The study examines the market for Indian art pottery and recommends specific items at specific prices, and undertakes to predict sales quotas of such items. It shows that there is an annual sales of \$21,000,000 in the U. S. alone of art ceramic items and that there is no commercially produced Indian pottery of any significance at this time. It proposes that a \$100,000 penetration of this market is less than one-half of one percent, and concludes that this is feasible. The study recommends a program of facilities and equipment starting with a 4,940 square foot plant employing 20 people to be expanded to a 10,000 square foot plant employing 129 people, with a corollary ceramics industry to employ another 125 over a ten year program. It proposes a plan of implementation including management, capital, labor, and facility requirements over a ten year period to be financed with an investment of \$250,000 and shows that a break-even point is possible by the end of the first full year of operation. (Author)

**PB-170 327** **PC A03 MF A01**  
Hawaii State Dept. of Planning and Economic Development, Honolulu.  
**Feasibility of Processing Tropical Fruit Concentrates in Puna, Hawaii.**  
Jun 65, 48p Rept no.  
Contract  
Prepared in cooperation with Economic Development Administration, Washington, D. C.

Descriptors: \*Economics, Hawaii, \*Hawaii, Economics, \*Fruits, Beverages, Feasibility studies, Processing, Dehydrated foods, Pectins, Costs, Concentration(Chemistry), Food, Industries. Identifiers: Area redevelopment.

A pilot plant operation to determine the feasibility of processing tropical fruits with acerola plant equipment was a definite success. The technicians who carried out the pilot plant operation have concluded it is technically possible to produce high quality concentrates from passion fruit, guava and papaya on a commercial scale. No serious technical problems were encountered in the operation. In

making these concentrates, the technologists attempted to get the highest brix reading possible instead of stopping at a lower and possibly more practical level of concentration. Subsequent product development work by the technologists proved satisfactory products could be made utilizing these concentrates. These products were jams, jellies, nectar bases, 2nd flavorings. An economic analysis of a projected full-scale commercial operation resulted in a very optimistic profit picture. These results apply only to the Puna District of Hawaii which offers unique advantages to the proposed operation. (Author)

**PB-173 709** **PC A03 MF A01**  
Coordination Center for Southeast Asian Studies Bangkok (Thailand).  
**Metalworking Equipment in Thailand.**  
Jul 63, 27p  
Prepared in cooperation with Business and Defense Services Administration, Washington, D. C.

Descriptors: \*Metal-forming presses, Commerce, \*Industries, Metal-forming presses, Thailand, Machine tools, Presses(Machinery), Small tools.

It is recommended that certain items of metal working equipment be exhibited in Thailand but only if they are produced in America in sizes which are appropriate for small industries, and at prices which can be paid by individuals. Further, it is recommended that any type of display must take account of the lack of knowledge, on the part of the small Chinese industry owner who will buy them, of what machines can do. He must be offered adequate information, explanation and demonstration.

**PB-173 710** **PC A03 MF A01**  
Far East Research Organization Ltd., Singapore.  
**Metal Cutting Machines in Malaya.**  
May 65, 36p  
Prepared in cooperation with Business and Defense Services Administration, Washington, D. C.

Descriptors: \*Cutting tools, Commerce, \*Commerce, Industries, Small tools, Economics, Metal-forming presses, Malaya, Machine tools.

In general the items likely to be in greatest demand in Malaysia are general purpose metal cutting machines likely to be used in small general purpose workshops. The machines should be robust and any sub assemblies which are difficult to repair should be easily removeable for exchange. The market for large or highly specialized machines is not likely to be large for several years.

**PB-174 333** **PC A03 MF A01**  
Commonwealth Scientific and Industrial Research Organization, Melbourne (Australia). Div. of Forest Products.  
**Contributions from Division of Forest Products, Csiro, to Uncsat Conference 1963.**  
27 Jun 66, 39p Rept no. Technical paper-46

Descriptors: \*Wood, Scientific research, Forestry, Structural properties, Trees, Paper, Climatology, Adhesives, Strength, Preservation, Tropical deterioration, Buildings, Humidity, Protective treatments, Reports, Australia.

Contents: Developing the structural use of native timbers: important technological factors; The behaviour of paper products under extreme climatic conditions; Tannin-formaldehyde adhesives; Preservation of hardwood building timbers with special reference to tropical countries; Timber utilization with special reference to sawing techniques and utilization of waste; Timber seasoning practices for conditions of high humidity in tropical areas.

**PB-174 346** **PC A04 MF A01**  
Forest Products Lab., Madison, Wis.  
**Houses Can Resist Hurricanes.**  
Research paper  
L. O. Anderson, and Walton R. Smith. Aug 65, 52p Rept no. FPL-33  
Prepared in cooperation with Southeastern Forest Experiment Station.

Descriptors: \*Construction materials, Tropical cyclones, \*Housing, Tropical cyclones, Structures, Damage control, Foundations(Structures), Storms.



The report is based on a study of hurricane damage to man-made structures over a period of years. Not all damage can be eliminated, but a very high percentage of damage observed in the past could have been avoided with simple, inexpensive commonsense principles applied to building construction. Some of these principles are demonstrated here—especially in respect to the value of good foundations and the importance of ties between parts of the structure. (Author)

**PB-174 673** **PC A13 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Small Canning Facilities.**  
Jun 56, 276p

Descriptors: \*Canning, \*Industrial plants, Operation, Industrial equipment, Economics, Site selection, Maintenance, Food, Containers, Personnel, Industrial training, Preparation, Processing, Industrial research.

The manual describes the equipment and materials required to establish small canning facilities. Information on plant layouts is provided, and operation procedures and processing data are presented. Three types of plants or centers are discussed; a small facility utilizing elementary utensils, an intermediate size plant utilizing commercial equipment and a larger plant with centralized steam-generating equipment. (Author)

**PB-175 521** **PC A09 MF A01**  
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.  
**Metal-Working Industry Training Manual.**  
1957, 184p Rept no. Technical Bull-62

Descriptors: \*Instruction manuals, \*Machine shop practice, \*Industrial training, Material forming, Metals, Dies, Material removal, Heat treatment, Industrial equipment, Operation, Supervisory personnel, Management engineering.

The manual contains material about the manufacturing practices and operational methods in the metal-working industry, relating principally to the use of machine tools and related equipment for manufacturing component parts of final products. It explains the efficient utilization of metal-working equipment, and allied problems of tooling, plant layout, methods, and the development of a program to assist the industry on production problems through a training program. This training program has been developed for senior management personnel, work managers, and foremen for the proper selection of machinery; utilization of machine tools; layout of production line; design, use, and making of jigs and fixtures; problems involving setup, machine loading, machine speeds, testing and quality control, selection of cutting tools, tool designs, tool-making and tool maintenance; and safety devices and programs in the shop. (Author)

**PB-175 522** **PC A03 MF A01**  
Agency for International Development, Washington, D. C. Communications Resources Div.  
**Planing Mill Dressed or Finished Lumber.**  
Dec 56, 47p  
Prepared in cooperation with Wolf Management Engineering Co., Chicago, Ill.

Descriptors: \*Wood, \*Industries, Aging (Materials), Drying, Air, Heat, Machine tools, Costs, Industrial equipment, Personnel, Saws, Operation, Commerce, Structural parts.

Contents: Function of the planing mill; Lumber; Lumber seasoning; Air drying; Kiln drying; Grading lumber; Machinery and equipment; Buildings; Personnel; Research; Accounting instructions; Investment and working capital requirements.

**PB-175 523** **PC A04 MF A01**  
Agency for International Development, Washington, D. C. Communications Resources Div.  
**Plant Requirements to Set Up and Operate Small Bread Bakeries.**  
Mar 60, 63p  
Prepared in cooperation with Holman (John F.) and Co., Inc., Washington, D. C.

Descriptors: \*Bread, Manufacturing methods, Industrial plants, Specifications, Industrial production, Costs, Labor, Economics, Power, Industrial equipment, Fuels, Transportation, Water.

Contents: General assumptions; Manufacturing operations; Plant site; Building requirements; Plant layout; Power; Water; Fuel; Transportation; Machinery and equipment; Production equipment; Direct labor requirements; Direct materials; Furniture and fixtures; Supplies; Cost breakdown per pound for white bread; Indirect labor cost; Depreciation; Manufacturing overhead; Manufacturing cost (annual); Fixed assets; Working capital; Capital requirements; Sales revenue; Recapitulation of costs, sales, and profits; Training; Sanitation; Safety; Conservation and accounting for losses in baking operations.

**PB-175 524** **PC A05 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Plant Requirements to Set Up and Operate a Brass Foundry.**  
Revised ed.  
May 59, 85p  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Industrial plants, Material forming, \*Brass, \*Material forming, Management engineering, Copper alloys, Aluminum alloys, Magnesium alloys, Casting, Molding, Costs, Industrial equipment, Manufacturing methods.

The manual deals with subjects concerning brass foundry operations and techniques. However, matters pertaining to the casting of other metals in the nonferrous category have been included, since it is quite generally the practice in America to utilize identical facilities to cast brass, bronze, zinc, aluminum, magnesium and other nonferrous metals. The manual includes current costs of labor, machinery, equipment and supplies, as well as additional information relative to engineering, training, safety, markets, sales, financial and economic factors.

**PB-175 525** **PC A03 MF A01**  
Agency for International Development, Washington, D. C. Communications Resources Div.  
**Plant Requirements for Manufacture of Mineral Wool.**  
Revised ed.  
Mar 62, 40p  
Prepared in cooperation with Vitro Engineering Co., Washington, D. C.

Descriptors: \*Industrial production, \*Thermal insulation, Manufacturing methods, Costs, Management engineering, Industrial equipment.

The purpose of this report is to present basic information relative to the establishment of a mineral wool plant in a foreign country. Mineral wool may be manufactured from rock, slag, or glass, any one of which may be processed from a molten state into a fluffy, light-weight mass of fine intermingled mineral fibers composed of complex silicates. This report pertains to the fabrication of loose and granulated mineral wool from slag. These materials are used mainly for thermal insulation by the building trades. When mineral wool is to be supplied to manufacturers of specialized acoustical and filter products, chemical analysis and control of the fiber and completed wool will be necessary to assure conformance to the customer's specifications. This plant will require a substantial capital investment and a reasonable number of skilled workmen. Raw materials should be available locally, particularly slag and coke. Generally, the less developed countries do not offer particularly favorable conditions for the production of mineral wool, nor a large enough domestic market to lead to a profitable venture. However, such a plant would be feasible in an industrially developing country where a large volume of new construction and industries would create a sufficient demand. A favorable factor would be association of the mineral plant with a factory processing high and low temperature mineral wool felts, industrial batts, blankets, blocks, boards, and molded pipe insulations. (Author)

**PB-175 526** **PC A03 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Plant Requirements for Manufacture of Candy and Confectionery.**  
Sep 57, 48p  
Prepared in cooperation with Wolf Management Engineering Co., Chicago, Ill.

Descriptors: \*Food, Manufacturing methods, Industrial plants, Industrial production, Specifications, Industries, Industrial equipment, Costs, Management planning.  
Identifiers: Confectioneries.

Contents: Candy origin and usage; The candy industry; Requisites of successful confectionery manufacturing; Principal raw materials and their characteristics; Manufacturing processes of basic types of candy; Plant requirements - physical; Plant requirements - quality and costs; Cost ratios in the candy industry; Operating ratios in 1955 - typical for U. S. manufacturer-retailers; Financial forecast; Average cost per pound of selected ingredients used by the United States confection industry.

**PB-175 527** **PC A06 MF A01**  
Agency for International Development, Washington, D. C. Communications Resources Div.  
**Plant Requirements for Processing of Dairy Products.**  
May 62, 102p  
Prepared in cooperation with Fehmerling Associates, Bridgeton, N. J.

Descriptors: \*Food, Processing, \*Milk, Processing, Industrial plants, Industrial production, Industrial equipment, Dehydrated foods, Power, Water, Fuels, Labor, Costs, Budgets, Economics, Instruction manuals, Specifications.  
Identifiers: Dairy products.

The manual provides information on the processing of milk and other dairy products for human consumption. It is primarily intended to give the reader a basic understanding of production and marketing methods.

**PB-175 531** **PC A06 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**A Small Sawmill Enterprise.**  
Revised ed.  
Apr 59, 101p

Descriptors: \*Wood, \*Industries, Machine tools, Portable, Saws, Operation, Costs, Labor, Money, Commerce, Law, Safety, Industrial equipment, Storage, Insects, Maintenance, Efficiency, Industrial procurement.

The publication contains machinery and processes for conversion of logs into lumber as an industrial enterprise, including both the mechanical and business aspects. It does not include the processes of extracting logs from forests or the seasoning of products of sawmills. It is intended to be useful to those considering the establishment of a small sawmill business in foreign countries, and may be helpful to some of those already conducting such a business. The selection, erection, and operation of small circular sawmills of standard and traditional types are described. (Author)

**PB-175 532** **PC A03 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Small Brass Foundry.**  
Oct 60, 35p Rept no. TR-26072-PR  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Industrial plants, Material forming, \*Brass, \*Casting, Castings, Industrial equipment, Management engineering, Costs.

The purpose of this report is to present basic information for establishing a brass foundry in a foreign country to produce brass castings. While the information shown in this report is based on brass products, other materials such as copper, aluminum and nonferrous alloys may be cast. (Author)



**PB-175 535** **PC A05 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Executive's Role in an Organization.**  
1957, 82p Rept no. Training Manual-110  
Prepared in cooperation with Industrial Development Center, Manila. Management Training Forum Services.

Descriptors: \*Management engineering, \*Supervisory personnel, Organizations, Management planning, Management control systems, Leadership, Job analysis, Instruction manuals.

Contents: Responsibilities of the executive; Company organization; Departmental organization; Planning; Directing; Coordinating; Controlling.

**PB-175 537** **PC A08 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Lumber Seasoning.**  
Edward C. Peck, and John M. McMillen. Jul 61, 165p  
Prepared in cooperation with Forest Products Lab.

Descriptors: \*Wood, Aging(Materials), Deterioration, Shrinkage, Moisture, Drying, Manpower, Handling, Degradation, Heat, Insects, Air, Costs, Storage, Foundations(Structures), Structures, Tables, Safety.

The report deals with the seasoning of lumber, especially by comparatively simple means applicable throughout the entire world. Seasoning is important because the removal of moisture from green wood is generally necessary before the material can be safely stored or used to best advantage. For particular uses, drying to a low moisture content is required. While the main part of this report refers to methods and techniques of air drying and kiln drying lumber, such other phases are covered as basic properties of wood, principles of moisture removal, protection of green wood from attack by fungi and insects, and dry lumber storage.

**PB-175 538** **PC A03 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Plant Requirements for Manufacture of Nylon Hosiery.**  
Oct 61, 33p  
Prepared in cooperation with Textile Associates, Inc., Boston, Mass.

Descriptors: \*Industrial production, \*Socks, Management engineering, Manufacturing methods, Industrial plants, Site selection, Buildings, Power supplies, Fuels, Industrial equipment, Labor, Personnel, Costs, Money, Budgets, Safety, Training, Commerce, Law, Machines, Management planning, Nylon, Management control systems.  
Identifiers: Nylon hosiery.

The purpose of this report is to present basic information for establishing a plant in a foreign country to produce women's full fashioned nylon hose from purchased nylon yarn. (Author)

**PB-175 539** **PC A03 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Plant Requirements for Manufacture of Cotton Dresses.**  
Revised ed.  
Apr 59, 40p  
Prepared in cooperation with Methods Engineering Council, Pittsburgh, Pa.

Descriptors: \*Industrial production, \*Clothing, Cotton textiles, Management engineering, Management control systems, Management planning, Manufacturing methods, Industrial plants, Site selection, Buildings, Power supplies, Industrial equipment, Fuels, Labor, Personnel, Costs, Money, Budgets, Safety, Training, Law, Machines, Commerce.

The cotton dress industry is described as one of the most competitive manufacturing businesses in the United States. For this reason, a great amount of effort has been applied to making the processes as efficient as possible. Despite rising costs of ma-

terials and labor, high productivity makes it possible to produce stylish, simple dresses that retail in the United States for three to four dollars. Most of these are produced in small and medium-sized factories such as the one described in this manual. (Author)

**PB-175 540** **PC A03 MF A01**  
Agency for International Development, Washington, D. C. Communications Resources Div.  
**Plant Requirements for Manufacture of Souvenirs and Saml Jewelry.**  
Nov 56, 37p  
Prepared in cooperation with H. D. Nottingham and Associates, Arlington, Va.

Descriptors: \*Castings, \*Industrial production, Manufacturing methods, Industrial equipment, Industrial plants, Casting, Costs, Molding, Wood.  
Identifiers: Jewelry.

The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. Three types of products have been considered. They are: conventional jewelry, ceramic souvenirs and jewelry and wooden souvenir products. Initial plant establishment may be any one of or combination of the three.

**PB-175 541** **PC A03 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Plant Requirements to Set Up and Operate a Job Machine Shop.**  
May 61, 49p  
Prepared in cooperation with Methods Engineering Council, Pittsburgh, Pa.

Descriptors: \*Industrial plants, \*Machining, Industrial equipment, Industrial production, Management engineering, Maintenance, Costs, Machine shop practice.

The purpose of this report is to present basic information for establishing and operating a job machine shop in a foreign country. The report includes current costs of labor, machinery, equipment and supplies, as well as additional information relative to engineering, training, safety, markets, sales, financial, and economic factors.

**PB-175 542** **PC A03 MF A01**  
Agency for International Development, Washington, D. C. Communications Resources Div.  
**Plant Requirements for Manufacture of Fruit and Vegetable Juices.**  
Sep 62, 49p  
Prepared in cooperation with Fehmerling Associates, Bridgeton, N. J.

Descriptors: \*Fruits, Beverages, \*Vegetables, Beverages, \*Beverages, Processing, Industrial plants, Manufacturing methods, Quality control, Specifications, Industrial production, Preservation, Industrial equipment, Site selection, Power, Water, Fuels, Labor, Costs, Budgets, Economics, Industrial procurement.

Contents: General assumptions; Product specifications; Production capacity; Manufacturing unit; Definition and classification of juices; Fruits and vegetables from which juices can be produced; Production procedures; Nectars; Use of preservatives; Quality control; Direct materials; Supplies; Plant layout; Plant site; Buildings; Power; Water; Fuel; Production equipment; Other tools and equipment; Furniture and fixtures; Direct labor; Indirect labor; Depreciation; Manufacturing overhead; Manufacturing costs; Fixed assets; Working capital; Capital requirements; Sales revenue; Recapitulation of costs, sales and profits; Budget control; Budget control accounts; Purchase requisition; Economics; Plant and operational requirements; Manufacturers of food processing equipment and supplies.

**PB-175 543** **PC A03 MF A01**  
Agency for International Development, Washington, D. C. Communications Resources Div.  
**Plant Requirements to Set Up and Operate a Wool Scouring Plant.**  
Mar 62, 48p

Prepared in cooperation with Thompson and Williams, Washington, D. C.

Descriptors: \*Fibers, Cleaning, \*Industrial plants, \*Cleaning, Processing, Management engineering, Costs.

The purpose of this report is to present basic information relative to the establishment of a wool scouring (washing) plant in a foreign country. This plant will scour raw grease wool and bale the scoured wool on a commission basis. Charges for this service are applied on the grease wool weight and the owner accepts 50 to 60 per cent of the original weight in scoured wool free of most impurities. (Author)

**PB-175 544** **PC A03 MF A01**  
Agency for International Development, Washington, D. C. Communications Resources Div.  
**Plant Requirements for Manufacture of High Alumina Refractory Brick and Cement.**  
Jul 62, 42p  
Prepared in cooperation with Hendryx (Dwight B.) and Associates, Inc., Pittsburgh, Pa.

Descriptors: \*Brick, Manufacturing methods, \*Industrial plants, Brick, Machine tools, Cements, Budgets, Maintenance, Grinding, Milling machines, Storage, Industrial production, Specifications, Costs, Buildings, Power, Refractory materials, Alumina, Safety, Industrial procurement.

The purpose of the report is to present basic information for establishing a manufacturing plant in a foreign country to produce high alumina refractory brick and cement. The aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) content of high alumina refractory brick may range from 50 percent to about 99 percent, depending on the refractory requirements. An analysis is made of the machinery and equipment used to produce these high alumina refractory bricks. (Author)

**PB-175 546** **PC A03 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Plant Requirements for Manufacture of Paint and Varnish Brushes.**  
May 69, 47p  
Prepared in cooperation with Wolf Management Engineering Company, Chicago, Ill.

Descriptors: \*Paint applicators, \*Industrial production, Manufacturing methods, Industrial equipment, Industrial plants, Costs.

The manual is designed to provide a general picture of the factors which must be considered in establishing and operating a small-scale factory of this type.

**PB-175 547** **PC A04 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Plant Requirements to Set Up and Operate a Plant for Plating of Automobile Parts.**  
Oct 61, 72p  
Prepared in cooperation with Vitro Engineering Co., Washington, D. C.

Descriptors: \*Plating, \*Industrial production, Metal coatings, Anodic coatings, Vehicle chassis components, Aluminum alloys, Steel, Brass, Zinc alloys, Electroplating, Industrial equipment, Industrial plants, Costs.

The publication describes processing and plant requirements for applying: (1) Decorative chromium coatings to automobile hardware made of steel, brass, aluminum and zinc die-casting alloys; and (2) Anodic coatings, both clear and colored, to parts made of aluminum alloys. (Author)

**PB-175 548** **PC A04 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Rough Sawing of Logs.**  
Oct 56, 65p  
Prepared in cooperation with Wolf Management Engineering Co., Chicago, Ill.

Descriptors: \*Wood, \*Industries, Trees, Saws, Costs, Machine tools, Labor, Efficiency, Com-



merce, Industrial equipment, Management planning, Personnel, Structures, Power, Specifications, Maintenance, Terrain, Wastes(Industrial).

The purpose of the report is to present basic information for establishing and operating a logging and sawmilling operation in any country where logging operations are considered feasible. The information includes general logging and sawmill methods, mill layout, machinery requirements, and the costs of materials, equipment, labor, and overhead expenses. (Author)

**PB-175 549** PC A03 MF A01  
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.  
**Hand-Made Blown Glass and Fine Cast Crystal.** Technical inquiry service.  
Jan 60, 36p  
Prepared in cooperation with Aries Associates, Inc., Stamford, Conn.

Descriptors: \*Glass, Material forming, Manufacturing methods, Castings, Furnaces, Industrial production, Industrial plants, Management engineering, Costs.

The manufacture of glass products of artistic merit requires highly skilled and experienced artisans, not only for the design and execution of the finished articles, but for the formulation and manufacture of batches of fine glass and crystal of desired working properties and attractive color and lustre. This report emphasizes the process of making the glass batch itself, the plant and equipment required, and general procedures of furnace work and annealing, rather than the skilled techniques of blowing, pressing, cutting or engraving required to produce and decorate the finished article. The operation of the proposed plant consists essentially in the manufacture of batches of various types of glass, largely for inventory, and the working up of glass into finished articles in a sequence of operations, many of which proceed more or less independently of the glass manufacturing operation. (Author)

**PB-175 550** PC A03 MF A01  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Wood Wastes.** Technical inquiry service.  
Apr 58, 35p  
Prepared in cooperation with Wolf Management Engineering Co., Chicago, Ill.

Descriptors: \*Wood, \*Wastes(Industrial), Particles, Costs, Specifications, Industrial production, Machine tools, Industrial equipment, Disposal, Manufacturing methods, Cleaning, Absorption, Curing agents, Abrasives, Packing materials, Storage, Management engineering.

Contents: Economic consideration; Uses of sawdust; Wood flour; (definition and description, history, uses, industry production, wood species used, raw material requirements, manufacturing methods, manufacturing systems, general comments on production equipment, protection of equipment, related business opportunities, selling prices, typical specifications, plant investment, production costs, operating statement and cost per ton).

**PB-175 551** PC A04 MF A01  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Human Relations in Management.** Management primer.  
1962, 68p Rept no. Training manual-93  
Report on Principles and Practices of Productivity.

Descriptors: \*Management engineering, \*Instruction manuals, Training devices, Production control, Wages, Personnel management, Labor, Supervision, Money, Public relations, Psychology, Employee relations.

Contents: Human relations and organization; Improving human relations; Dealing with representatives of employee groups; Principles of supervision; Human relations and productivity. (Author)

**PB-176 700** PC A04 MF A01  
National Swedish Inst. for Building Research, Stockholm (Sweden).  
**Building and Planning in Developing Countries: A Partially Annotated Bibliography.**  
1967, 71p Rept no. 28:1967

Descriptors: \*Construction, Bibliographies, \*Housing, \*Urban planning, Sweden, Reports, Climatology, Construction materials, Urban areas, Economics, Sociology, Africa, Asia, Central America, South America.

In recent years interest in the problems of the developing countries has been gathering momentum amongst Swedish technologists. The present bibliography is step aimed especially at helping architects interested in this field. It consists of 450 references to books, reports and articles, out of which 80 were commented upon. The references have been grouped under the following nine sub-headings: (1) Climate and its influences, (2) Building materials and construction techniques, (3) Building design, (4) Town-planning, (5) Urbanization, (6) Economics, (7) Sociology, (8) Housing, and (9) General.

**PB-177 544** PC A11 MF A01  
Stanford Research Inst., Menlo Park, Calif.  
**Water, Mineral, and Forest Resources in Regional Economic Development.**  
Robert K. Arnold, Ernest C. Harvey, Genie E. Willeke, and Joseph E. R. Carrier. Sep 66, 235p  
Contract C-300-66

Descriptors: \*Natural resources, United States, Economics, Minerals, Forestry, Water, Organizations, Fiberboard, Atmospheric precipitation, Evaporation, Industries, Metals.  
Identifiers: Area planning and development, Regional economic development.

Extensive literature and numerous programs exist concerning the development of forest, mineral, and particularly, water resources in specific areas of the United States. Comparatively little of this work is directed specifically to the relation between development of resources and regional growth, much less to the specific programs and policies of a regional organization whose objectives are to maximize regional economic development. It is the purpose of the report to provide some guide by indicating the relevant sections of the literature. This is essentially a task of interpretation. The growth of income and employment in regions of the United States may be explained in terms of the location and growth of basic industries and their cumulative effect on other industries. Analysis of the future growth potential of any region may be viewed as the study of the future growth of individual industries, the factors that influence their location, and the interrelations among various industries. (Author)

**PB-177 908** PC A08 MF A01  
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.  
**The Role of Small-Scale Manufacturing in Economic Development. The Experience of Industrially Advanced Nations as a Guide for Newly Developing Areas.**  
Nov 57, 172p  
Prepared in cooperation with Stanford Research Inst., Menlo Park, Calif.

Descriptors: \*Industries, \*Economics, Production, Growth, Training, Factories, Agriculture, Fishes, Commerce, Mobilization, Switzerland, Transportation, Textiles, Australia, USSR, United States, Japan, Sweden, Management engineering.  
Identifiers: Small businesses, Industrial management.

The manual is concerned with the appropriate structure of manufacturing in underindustrialized but developing countries. It is not concerned with the over-all process of economic growth. It assumes that some degree of industrialization will occur in underindustrialized societies and inquires only as to the proper balance between large-scale and small-scale manufacturing units. More specifically, it examines the proposition that economic growth may be retarded by overemphasis upon large-scale industrial operations. (Author)

**PB-177 909** PC A09 MF A01  
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.  
**Development of Private Industry Through Public Aid (With Reference to Underdeveloped Countries).**  
J. K. Allen. Sep 58, 177p  
Prepared in cooperation with Stanford Research Inst., Menlo Park, Calif.

Descriptors: \*Economics, \*Industries, Government(Foreign), Commerce, Manpower, Training, Standardization, Money, Banking, Industrial production.  
Identifiers: Underdeveloped countries.

The report is a statement of principles treating government actions designed to assist the growth of privately operated manufacturing establishments. It is designed to be used as a guide by ICA staff and officials of underdeveloped countries concerned with the task of industrial development. It provides both background and examination of the many steps which government can take to promote and accelerate the growth of the private sector of the economy in ways that can be beneficial to the growth of a nation as a whole. (Author)

**PB-177 912** PC A03 MF A01  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Improved Productivity in the Factory. A Jobbing Machine Shop.**  
Feb 58, 31p  
Prepared in cooperation with Methods Engineering Council, Pittsburgh, Pa., and Creative Arts Studio, Inc., Washington, D. C.

Descriptors: \*Management planning, \*Manufacturing methods, Human engineering, Design, Production, Maintenance, Machine tools, Machine shop practice, Safety, Quality control, Inventory control, Production control.

This brochure outlines some of the important factory conditions which lead to low efficiency. Its purpose is to show how step-by-step remedial action may be taken to correct these conditions, and improve productivity with no major expenditure for new machinery or equipment.

**PB-177 914** PC A03 MF A01  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Automobile Body Corrosion Prevention. Maintenance and Repair Procedure.**  
Jul 60, 29p

Descriptors: \*Passenger vehicles, Corrosion inhibition, \*Cargo vehicles, Corrosion inhibition, Maintenance, Finishes + finishing, Epoxy plastics, Polyester plastics, Filling, Lead alloys, Specifications.

Contents: Introduction; Automobile body coatings; Failures of coatings and corrosion; Primary maintenance recommendations; Maintenance procedures; Suppliers; Tools and equipment used for repairs to metal automobile bodies; Bibliography of government specifications; Conclusion.

**PB-177 915** PC A05 MF A01  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Men's Work Shirts. Capital Requirements, Techniques and Operations.**  
1961, 76p  
Prepared in cooperation with Wolf Management Engineering Co., Chicago, Ill. A Reference for use in Planning New Industrial Facilities.

Descriptors: \*Clothing, \*Industrial production, Costs, Industrial plants, Quality control, Management engineering, Standards, Manpower, Manufacturing methods, Employment, Production control, Industrial equipment.

The report is concerned with the inexpensive work shirt. Being a staple item of clothing and sold in great volume under highly competitive conditions, it must necessarily be produced efficiently, using the best methods and equipment, if the enterprise is to be successful. Fortunately, the processes are



well defined and comparatively simple, and the machinery required is readily available at reasonable cost. The basic information and factual data required for consideration before engaging in the business are presented. (Author)

**PB-177 916** **PC A13 MF A01**  
International Cooperation Administration, Washington, D. C.  
**Papermaking and Manufacture of Paper Products as a Small-Scale, Semi-Mechanized and Cottage Industry. Materials--Processes--Equipment Organization--Economics--marketing.**  
J. Ben Lieberman. Jun 58, 291p  
Prepared in cooperation with Stanford Research Inst., Menlo Park, Calif.

Descriptors: \*Paper industry, \*Economics, Paper, Manufacturing methods, Feasibility studies, Site selection, Industrial training, Natural resources, Organic materials, Materials, Agriculture, Test methods, Analysis, Sociology, China, Japan.

This Manual is designed to provide a general picture of the factors which must be considered in establishing and operating a small-scale papermaking industry. It should prove useful in creating interest in the subject, and serve to give enough understanding of the related considerations to help government officials, other leaders and entrepreneurs determine whether the potential deserves more detailed attention. Also, special segments of the Manual may serve as separate manuals or references for specific phases of the subject.

**PB-177 918** **PC A03 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Plant Requirements for Manufacture of Buckets, Pails and Pans.**  
Revised ed.  
May 59, 38p  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Containers, Industrial production, Kitchen equipment + supplies, Manufacturing methods, Industrial plants, Costs, Zinc coatings, Corrosion inhibition, Tin coatings, Costs, Labor, Industrial equipment, Personnel, Training.

Galvanizing is a process by which iron or steel is coated with zinc to render it rust-resistant. There are three general methods for accomplishing this. They are, (1) the hot - dip method; (2) the electro-galvanizing method; and (3) the 'Sherardizing' method. This manual describes the hot-dip method because it is the most widely used and because of its economic advantages over the other methods. The tinning process is accomplished by the same basic method. The galvanizing process is used in the manufacture of buckets, pails, wash tubs, water tanks and many industrial products. It cannot be used in any product which comes in contact with food, however, because the zinc will contaminate the food. Tinned products, on the other hand, are used extensively for food containers. There is very little tinning done by the hot-dip method in the United States due to the high cost of tin. In fact, many manufacturers are using aluminum, stainless steel, and copper for cooking utensils instead of tinning. In other parts of the world, however, tin would probably be cheaper than other applicable materials. (Author)

**PB-177 919** **PC A03 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Plant Requirements for Manufacture of Ceramic Dinnerware.**  
Revised ed.  
May 59, 41p  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Kitchen equipment + supplies, Industrial production, Ceramic materials, Industrial plants, Industrial equipment, Manufacturing methods, Costs, Labor, Commerce, Standards, Personnel, Training, Safety.  
Identifiers: Dinnerware.

Dinnerware production in the United States ranges from very high production from highly mechanized factories to very small potteries which produce in small quantities. The smaller potteries generally depend on the unusual in design in marketing their ware, while the larger potteries rely heavily on competitive pricing. The products of the plant discussed in this report are those comprising a line of relatively heavy, serviceable, semi-vitreous dinnerware. A representative assortment of products consists of cups, saucers, 6-inch and 10-inch plates, salad bowls, and large serving bowls. (Author)

**PB-177 920** **PC A03 MF A01**  
Agency for International Development, Washington, D. C. Communication Resources Div.  
**Plant Requirements to Set Up and Operate a Gray Iron Jobbing Foundry.**  
Revised ed.  
Apr 59, 40p  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Casting, \*Iron industry, Iron, Molding, Melting, Cleaning, Costs, Industrial plants, Industrial equipment, Labor, Safety.

The manual is predicated on establishing a small gray iron foundry doing a general or jobbing business, and turning out a production of about 8 tons a day of finished castings. This production level was selected because it represents a small, yet economical unit, employing 30 to 35 men. (Author)

**PB-177 921** **PC A03 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Plant Requirements for Manufacture of Men's Socks.**  
Revised ed.  
May 59, 33p  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Socks, \*Industrial production, Industrial plants, Costs, Labor, Industrial equipment, Dyes, Budgets, Manufacturing methods, Training, Personnel.

The purpose of this manual is to present basic information for establishing and operating a small plant for the manufacture of men's socks. Except for a small percentage all socks are made by the knitting process. There are about 4,000 knitting industries in the United States. A few of the products made in these industries include outerwear, underwear and hosiery. However, this manual will be devoted exclusively to men's socks. The term sock used in this manual denotes a short stocking as distinguished from a hose that is longer. (Author)

**PB-177 922** **PC A03 MF A01**  
Agency for International Development, Washington, D. C. Communications Resources Div.  
**Plant Requirements to Set Up and Operate a Plastic Molding Plant.**  
Revised ed.  
Apr 59, 49p  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Plastics, \*Industrial production, Plastics industry, Industrial plants, Industrial equipment, Manufacturing methods, Molding, Dies, Labor, Costs.

It is assumed, for this prospectus, that the market for the products of any plastic molding plant which might be established will be primarily non-industrial. It is also assumed that a hypothetical plan, if sound from the point of view of both economics and technical considerations, would be helpful. Accordingly, such a plan with the capital requirements limited to approximately \$240,000 is presented. (Author)

**PB-177 923** **PC A03 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Plant Requirements for Manufacture of Sanitary Ware.**  
Revised ed.

May 59, 39p  
Prepared in cooperation with Andrews (George H.) Associates, Inc., Washington, D. C.

Descriptors: \*Toilet facilities, \*Industrial production, Ceramic coatings, Industrial equipment, Industrial plants, Manufacturing methods, Iron, Castings, Costs, Labor, Standards.

The process of enameling cast iron sanitary ware imparts a hard, glossy surface to the object. This coating permits easy cleaning and presents a pleasing appearance. It is stain resistant, highly acid resistant, and, if properly applied and given reasonable care in usage, will last almost indefinitely. The type of plant described in this report is one which could be set up in almost any part of the world. The basic raw materials -- pig iron, scrap iron, and sand -- are ordinarily obtainable in all parts of the world. Where special skills would be required for the production of the ware, modern machinery has been substituted wherever feasible. In this way, the operation can be started more readily and quality standards can be reached sooner. (Author)

**PB-177 924** **PC E99 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Plant Requirements for Manufacture of Terry Cloth.**  
Revised ed.  
May 59, 37p  
Prepared in cooperation with Andrews (George H.) Associates, Inc., Washington, D. C.

Descriptors: \*Textiles, \*Industrial production, Labor, Costs, Industrial equipment, Industrial plants, Manufacturing methods, Cotton.  
Identifiers: \*Terry cloth.

Terry cloth is cotton fabric covered with loops on one or both sides. It requires two sets of warps and one set of filling; one set of warp threads is held taut while weaving, the other set is released to form the loops. When woven in linen (rare) or bleached cotton in narrow widths, terry cloth is called 'Turkish toweling.' This usually has two loops (called double-loop terry). It can also be made in checks, stripes, or plaid, or bleached and dyed. Uses include towels, wash cloths, robes, bath mats, bathing suits or sunsuits, linings for suits and coats, draperies, spreads, bedrolls, and potholders. Terry cloth readily absorbs and retains moisture, making it suitable for use as wash cloths and toweling. It is used in some applications because of its efficiency as an insulating medium and because it is readily washed when soiled. Due to the fact that the applications of single-loop terry cloth are numerous and in good volume, the discussion is concerned with the production of cloth of that type in a mill of minimum economic size. (Author)

**PB-177 925** **PC A03 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Plant Requirements for Manufacture of Wood Tables and Chairs.**  
Revised ed.  
May 59, 46p  
Prepared in cooperation with Andrews (George H.) Associates, Inc., Washington, D. C.

Descriptors: \*Kitchen equipment + supplies, \*Industrial production, Wood, Manufacturing methods, Industrial plants, Industrial equipment, Costs, Labor.  
Identifiers: Tables and chairs.

The purpose of this manual is to provide information for the establishment and operation of a small plant to manufacture low cost wooden tables and chairs. The table and chairs shown in this manual are designed for low cost production and are not intended for the luxury market. Local customs might require some change in the designs. However, design changes that will add substantially to the cost of the product should be avoided. (Author)

**PB-177 926** **PC A04 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.



**Plant Requirements to Set Up and Operate a Meat Processing Plant.**

Revised ed.  
May 59, 54p  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Meat, Processing, Industrial plants, Industrial equipment, Personnel, Production control, Labor, Costs.

The purpose of this manual is to provide information about the establishment and operation of a small meat processing plant. The manual provides a description of the slaughtering and of the processing of meat products as these activities might be carried out in a small plant in United States. It includes a description of the plant layout, equipment and personnel and estimates of investment, operating costs and revenues. Local situations might make some changes desirable but the plant described is satisfactory for a considerable variation in materials and methods of processing and product without serious modification of the design and operation. (Author)

**PB-177 927** PC A03 MF A01  
International Cooperation Administration, Washington, D. C.

**Plant Requirements for Manufacture of Worsted Yarns.**

Sep 61, 35p  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Fibers, Industrial production, Manufacturing methods, Industrial plants, Industrial equipment, Costs, Labor, Training.

No abstract available.

**PB-177 928** PC A03 MF A01  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.

**Plant Requirements to Set Up and Operate a Dry Cleaning Plant.**

Sep 57, 47p  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Industrial plants, \*Cleaning, Textiles, Cleaning compounds, Solvents, Industrial equipment, Costs, Driers(Apparatus), Presses(Machinery), Packaging, Safety.  
Identifiers: Dry cleaning.

The small dry cleaning plant described in this brochure is intended to clean and finish all types of clothing, bedding, draperies and many other kinds of household textile articles. Dry cleaning textile articles generally is done by washing them in petroleum solvent, such as benzine, or in synthetic solvent, such as perchlorethylene. The equipment for one of these processes cannot be used for the other process. The dry cleaning process carried out in a synthetic-solvent plant using perchlorethylene is described in this brochure. (Author)

**PB-177 929** PC A03 MF A01  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.

**Plant Requirements for Manufacture of Flush Doors.**

Sep 67, 34p  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Doors, \*Industrial production, Wood, Manufacturing methods, Industrial plants, Industrial equipment, Specifications, Labor, Costs.

The equipment and operating procedures described in this brochure are intended for the production of flush doors as an addition to, or the expansion of, an existing woodworking plant, where there is sufficient demand for these products and where such a local operation would be practicable. The equipment and methods shown in this brochure are modern and capable of making all grades of flush doors, both interior and exterior, up to 3 feet wide and 7 feet long. (Author)

**PB-177 930** PC A03 MF A01  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.

**Plant Requirements for Manufacture of Plywood.**

Sep 57, 45p  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Plywood, \*Industrial production, Manufacturing methods, Industrial plants, Industrial equipment, Storage, Handling, Wood, Processing, Labor, Costs.

The small plywood plant described in this brochure is intended to manufacture plywood panels in a foreign country, where there is sufficient demand for these products and where such a local operation would be practicable. The machinery, equipment and methods shown in this brochure are modern and capable of making all grades of veneer and plywood, including marine plywood. The plant will operate equally well with either hard or soft wood. (Author)

**PB-177 931** PC A02 MF A01  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.

**Plant Requirements for Manufacture of Porcelain Enamelware.**

Apr 56, 20p  
Prepared in cooperation with Penniman and Browne, Baltimore, Md.

Descriptors: \*Kitchen equipment + supplies, \*Industrial production, Cooking devices, Manufacturing methods, Processing, Industrial equipment, Industrial plants, Costs.

Contents: Manufacturing operations; Plant requirements; Suggested sources of supply for raw materials and processing equipment; Illustration; Supplementary data; Sources of information.

**PB-177 932** PC A03 MF A01  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.

**Plant Requirements for Manufacture of Asbestos - Cement Pipe.**

Jun 60, 33p  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Pipes, \*Industrial production, Asbestos, Cements, Manufacturing methods, Industrial plants, Industrial equipment, Costs, Labor.

As indicated by the name, asbestos-cement pipe is made of asbestos fibre and Portland cement, usually in combination with some other material like silica. A curing agent may also be added but this is not always necessary. In the United States the market for asbestos-cement pipe is large and growing steadily. This favorable situation has grown from the fact that these products meet many of the needs for pipe with the physical characteristics of asbestos-cement products. They are inexpensive and with unusual resistance to various corrosive fluids found in many pipe systems. Asbestos does not burn and is a very poor conductor of electricity. (Author)

**PB-177 933** PC A04 MF A01  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.

**Plant Requirements for Manufacture of Soybean Oil and Meal.**

Sep 61, 62p  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Vegetable oils, Processing, Industrial plants, Industrial equipment, Phospholipids, Food, Glycerols, Acids, Yeasts, Colloids, Paints, Insecticides, Purification, Labor, Costs.  
Identifiers: Soybeans.

Soya beans, which are native to eastern Asia, are now grown extensively in all parts of the world. They thrive best in the temperate zone. The uses for the end product are many, at latest count numbering some 150 separate applications. The principal uses of the expelled crude soya oil include

seven basic categories: (1) Technical refined oils; (2) Edible refined oils; (3) Edible lecithin; (4) Technical lecithin; (5) Medicinal lecithin; (6) Glycerine; (7) Acids. (Author)

**PB-177 934** PC A03 MF A01  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.

**Plant Requirements for Manufacture of Chalk Whiting.**

Sep 61, 36p  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Mineral products, \*Industrial production, Limestone, Material separation, Particle size, Manufacturing methods, Industrial plants, Industrial equipment, Labor, Costs.  
Identifiers: Chalk whiting.

The report is primarily concerned with the absolute minimum operation for manufacture of true chalk whiting and, therefore, discusses the simplest manufacturing processes utilizing the crushing, grinding, and screening of high purity chalk. However, sources of raw material for the manufacture of true whiting are limited. This, and many other factors have led to the development of whiting substitutes with their alternate methods of manufacture and production. The CaCO<sub>3</sub> chemical industry that has grown up in the United States in recent years is an outstanding example of such a development. Before presenting the detailed description of the manufacture of true chalk whiting, sufficient information on whiting substitutes is included to present a basic concept of methods for their production and to offer to present a basic concept of methods for their production and to offer sources of information for further study of operations that may be adaptable to any locale and its available raw materials. (Author)

**PB-177 935** PC A03 MF A01  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.

**Plant Requirements for Manufacture of Stretch Socks for Men and Children.**

Sep 61, 34p  
Prepared in cooperation with Andrews (George H.) Associates, Inc., Washington, D. C.

Descriptors: \*Socks, \*Industrial production, Manufacturing methods, Textile industry, Industrial plants, Industrial equipment, Dyes, Labor, Costs.

The purpose of this report is to present basic information for establishing a manufacturing plant in a foreign country to produce stretch socks for men and children. Such a manufacturing plant is generally known as a knitting mill. (Author)

**PB-177 936** PC A04 MF A01  
Agency for International Development, Washington, D. C. Communications Resources Div.

**Plant Requirements for Manufacture of Cement.**

Dec 61, 58p  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Cements, \*Industrial production, Manufacturing methods, Industrial plants, Industrial equipment, Processing, Construction materials, Production control, Labor, Costs.

No abstract available.

**PB-177 937** PC A03 MF A01  
Agency for International Development, Washington, D. C. Communications Resources Div.

**Plant Requirements for Manufacture of Ready-Mixed Concrete.**

Mar 62, 31p  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Concrete, \*Industrial production, Manufacturing methods, Industrial plants, Industrial equipment, Labor, Costs.

The purpose of this report is to present basic information for establishing a manufacturing plant in a



foreign country to produce dry ready-mixed concrete in paper bags. Dry ready-mixed concrete is made of various mixtures of cement and aggregates and these mixtures are called by various names such as 'dry mix cement,' 'Ready mixed concrete' and 'ready mixed cement.' Some of the names used are trade names, such as 'homecrete' and 'sackcrete.' Some of these may include additives or admixtures that are intended to produce certain desirable qualities in the final product. For the purposes of this report the product is called ready-mixed concrete. This product is made up of cement, sand and gravel, without any special additives. This ready-mixed concrete is intended for use by homeowners and others who need only a small amount of concrete at any one time and who cannot, therefore, buy the cement, the sand and the gravel separately, to their advantage. The ready-mixed concrete is kept on hand in retail hardware stores, paint stores, lumber yards, and building supply places. Thus it always will be convenient for any homeowner or other possible user who may wish to purchase small quantities for immediate use. (Author)

**PB-177 938** **PC A02 MF A01**  
Agency for International Development, Washington, D. C. Communications Resources Div.  
**Plant Requirements for Manufacture of Brooms.**  
May 57, 14p  
Prepared in cooperation with Thompson and Williams, Washington, D. C.

Descriptors: \*Industrial production, Maintenance equipment, Costs, Buildings, Wages, Materials, Manpower, Quality control, Manufacturing methods, Industrial equipment, Industrial plants.  
Identifiers: \*Brooms.

The manufacture of brooms offers a profitable business opportunity adaptable to broad variation in initial investment required, locale, raw materials, labor requirements, climate, and market conditions. Existing buildings may in many cases be adapted to house a modern broom factory with little or no alteration. The principal requirements are adequate floor space, a source of power, and ventilation. Fireproof buildings are desirable especially for warehousing space since fire insurance rates in many locations are high for any operation involving combustible materials. (Author)

**PB-177 939** **PC A03 MF A01**  
Agency for International Development, Washington, D. C. Communications Resources Div.  
**Plant Requirements for Manufacture of Mechanical Springs.**  
Revised ed.  
Jul 62, 48p  
Prepared in cooperation with Vitron Engineering Co., Washington, D. C.

Descriptors: \*Springs, \*Industrial production, Manufacturing methods, Industrial plants, Industrial equipment, Production control, Specifications, Machining, Labor, Costs.

The purpose of this report is to present basic information relative to the establishment of a plant to manufacture mechanical springs in a foreign country. Springs may be produced in a wide variety of shape, such as coiled, spiral, flat, leaf, ring, and numerous special shapes. They may be of various types, depending upon their intended use, such as tension, compression, torsion, extension, cantilever, etc. The ends may be formed to most any shape desired, such as tightly coiled, looped, squared, hooked, open, etc. A plant may manufacture only stock type springs for general purpose use, or it may manufacture a wide variety of shapes, types, and sizes to a customer's individual specifications. The plant described herein has been planned and equipped to produce initially the six general groups of spring products listed under 'Product Specifications.' This production can be varied to suit local conditions. A plant of this type will require a substantial capital investment and a relatively skilled labor force. Obviously, an economically underdeveloped country could not profitably support a plant of this type, as a market for spring products will not exist until general industrial development is quite advanced. However, in a suitable environment, a plant such as this can realize

substantial profits with efficient management, production controls, and sales effort. (Author)

**PB-177 940** **PC A03 MF A01**  
Agency for International Development, Washington, D. C. Communications Resources Div.  
**Plant Requirements for Manufacture of Wallboard from Gypsum and Fiber.**  
Dec 62, 33p  
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Fiberboard, \*Industrial production, Panels(Structural), Gypsum, Fibers(Natural), Manufacturing methods, Industrial plants, Industrial equipment, Labor, Costs.

The purpose of this report is to present basic information for establishing a manufacturing plant, in a foreign country, to produce wallboard from gypsum and coconut husk fibers. (Author)

**PB-177 943** **PC A03 MF A01**  
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.  
**Mayonnaise.**  
Technical inquiry service.  
1 May 59, 29p  
Prepared in cooperation with Snell (Foster D.) Inc., New York.

Descriptors: \*Food, Processing, Colloids, Costs, Production, Industrial equipment, Industrial plants, Packaging, Sanitary engineering.  
Identifiers: Mayonnaise.

The report covers the procedures, plant equipment, and economics involved in the manufacture of 250,000 pounds of mayonnaise per year. Two manufacturing procedures are covered: (1) Batch mixing or beating; (2) Continuous emulsification or homogenization. Economics of operation for each process are shown for investment comparisons, and include lists of equipment required, labor, utility, and material balances. Formulas for several types of commercial mayonnaise are given. (Author)

**PB-177 944** **PC A03 MF A01**  
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.  
**A Small Particle Board Plant.**  
Technical inquiry service.  
Jun 59, 35p  
Prepared in cooperation with Andrew (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Panels(Structural), \*Industrial production, Manufacturing methods, Industrial plants, Industrial equipment, Production control, Labor, Costs.  
Identifiers: Particle board.

The purpose of this report is to present basic information for establishing and operating a small particle board plant in a foreign country. The plant is designed to produce about 120 boards per hour. Based on current practice in the United States, this is a small plant. The recommended equipment and production methods are modern and have proven profitable when operating under conditions comparable to those assumed. (Author)

**PB-177 945** **PC A03 MF A01**  
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.  
**Aluminum Door and Window Sash.**  
Technical inquiry service.  
Nov 59, 46p  
Prepared in cooperation with Lederer (A. M.) and Co., Inc., New York.

Descriptors: \*Structural parts, Aluminum, Costs, Manpower, Extrusion, Assembling, Site selection, Manufacturing methods, Industrial equipment, Doors, Industrial production, Buildings, Industrial plants, Inventory control, Training, Safety.  
Identifiers: Sashes(Structural), Windows.

Aluminum is used in place of or along with wood and other forms of building materials in the manufacture of window and door sash in residential,

commercial, and manufacturing structures. Aluminum sash doors and windows are generally made of extruded aluminum sections, glass, aluminum mesh screens, neoprene vinyl, and stainless steel. A wide variety of designs and sizes is manufactured depending upon the use to which the units are to be put. (Author)

**PB-177 946** **PC A03 MF A01**  
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.  
**Silk Screen Printing on Textiles.**  
Technical inquiry service.  
Jul 60, 41p  
Prepared in cooperation with Mayer (Frank) Engineering Co., Los Angeles, Calif.

Descriptors: \*Textiles, \*Printing, Fibers(Natural), Fibers(Synthetic), Dyes, Costs, Labor, Industrial equipment, Colors, Industrial plants.

Silk screen printing varies in complexity from a simple operation to a highly scientific art. If confined to the use of pigmented dyes, a satisfactory product can be produced for cottage industry with a minimum of equipment and without the need of highly trained and skilled color chemists and special equipment for dye setting and aging. It is basically a service industry since no product is produced; instead printing is done to supply the needs of other manufacturers for decoration of their products. One thousand to twelve hundred yards of material can be printed on five tables by six people on one eight-hour shift. (Author)

**PB-177 948** **PC A05 MF A01**  
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.  
**Lubrication Fundamentals and Practices. Sessions I, II, and III.**  
Apr 57, 91p Rept no. Technical Bull-43  
Prepared in cooperation with Armstrong Cork Co., Lancaster, Pa. See also Session 4, 5, 6 and 7, PB-177 949.

Descriptors: \*Lubrication, Instruction manuals, Greases, Oils, Protection, Bearings, Viscosity, Friction, Specifications, Gears, Industrial equipment, Handling, Storage.

Contents: Principles of lubrication; Characteristics of lubricants; Methods of applying lubricants; Gears and their lubrication; General bearings, electric motors and their lubrication; Lubrication of plant equipment; and Lubrication department operation.

**PB-177 949** **PC A07 MF A01**  
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.  
**Lubrication Fundamentals and Practices. Sessions IV, V, VI and VII.**  
Apr 57, 137p Rept no. Technical Bull-44  
See also Sessions 1, 2, and 3, PB-177 948. Prepared in cooperation with Armstrong Cork Co., Lancaster, Pa.

Descriptors: \*Lubrication, Instruction manuals, Gears, Bearings, Electric motors, Friction, Industrial equipment, Lubricants, Handling, Storage.

Contents: Gears and their lubrication; Lubrication of general bearings and electric motors; Lubrication of plants equipment; Lubrication department operation.

**PB-177 955** **PC A05 MF A01**  
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.  
**Department Store Merchandising.**  
1961, 79p Rept no. Technical Bull-63

Descriptors: \*Management engineering, Instruction manuals, Money, Costs, Organizations, Operation, Commerce, Personnel management, Management planning.  
Identifiers: Merchandising.

The manual provides eight sessions on the subject of Retail Merchandising or Store Management. The training course in 'Retail Merchandising' is directed to the specific purpose of training people in



the best methods and procedures in the conduct of a small retail or department store. The material for the conduct of this course is, more or less, in outline form.

**PB-177 956** **PC A04 MF A01**  
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.  
**Retail Selling.**  
George H. Andrews. 1961, 73p Rept no. Technical Bull-65  
Prepared in cooperation with Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Management engineering, Instruction manuals, Costs, Money, Training, Personnel management, Commerce, Management planning.

The manual provides nine sessions on the subject of 'Retail Selling.' The training course in 'Retail Selling' is directed to the specific purpose of training people in the best methods and procedures in the conduct of a small retail store.

**PB-177 962** **PC A04 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Management Primer. Principles and Practices of Productivity. Personnel Administration.**  
1962, 73p Rept no. Training manual-94

Descriptors: \*Management engineering, Instruction manuals, \*Personnel management, Instruction manuals, Employment, Job analysis, Wages, Employee relations, Motivation, Organizations, Personnel, Training, Records.

Contents: Selection and Hiring of Employees; Compensation of Employees and Job Rating; Employee Training; Training of Supervisors; Employee Relations; Personnel Records.

**PB-177 963** **PC A04 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Management Primer. Principles and Practices of Productivity. Controls and Supervision.**  
1962, 62p Rept no. Training manual-95

Descriptors: \*Management engineering, Instruction manuals, \*Supervision, \*Management control systems, Personnel management, Quality control, Records, Money, Supervisory personnel, Training, Production control, Inventory control, Costs.

Contents: Planning for control; Setting up control procedure; Controls as money savers; The supervisor and supervision; The supervisor as an organ of control; Visual controls in supervision.

**PB-177 964** **PC A04 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Management Primer. Principles and Practices of Productivity. Procurement and Inventory.**  
1962, 59p Rept no. Training manual-98

Descriptors: \*Management engineering, Instruction manuals, \*Inventory control, Management planning, Management control systems, Procurement, Costs, Organizations, Inventory, Contracts, Stock level control, Storage, Quality control, Budgets.

Contents: Five principles of good procurement; The practice of procurement; Sound procurement policy; Centralized procurement; Organization for procurement; The procurement contract; The question: Make or buy; Procurement and inventory; The role of inventory in an enterprise; The problems of inventory management; The aims of inventory management; The administration of inventory; Budgeting for inventory; The role of receiving in inventory management; The management of storage.

**PB-177 965** **PC A04 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Management Primer. Principles and Practices of Productivity. Distribution and Sales.**  
1962, 70p Rept no. Training manual-100

Descriptors: \*Management engineering, Instruction manuals, Commerce, Consumption, Distribution (Economics), Costs, Management planning, Production.

Contents: The place of sales in business management; The consumer and competition; Market research and sales forecasting; Merchandising; Pricing policy; Service; Advertising; and Sales management.

**PB-177 966** **PC A05 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Management Primer. Principles and Practices of Productivity. Research and Public Relations.**  
1962, 95p Rept no. Training manual-101

Descriptors: \*Management engineering, Instruction manuals, Commerce, Public relations, Production, Problem solving, Industrial psychology.

No abstract available.

**PB-177 967** **PC A04 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Sales Promotion Methods.**  
George H. Andrews. 1962, 66p Rept no. Training Manual-103  
Prepared in cooperation with Andrews Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Management engineering, \*Commerce, Catalogs, Display systems, Public relations, Management planning, Professional personnel, Instruction manuals.  
Identifiers: Sales promotion, Salesmen.

Contents: What is sales promotion; The scope of sales promotion; A salesman's tools; Window and interior displays; Direct mail advertising; Catalogs and price lists; Advertising specialties, premiums, and contents; and Coordination - key to successful sales promotion.

**PB-177 971** **PC A05 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Marketing Research.**  
1962, 85p Rept no. Training manual-117  
Prepared in cooperation with Andrews (G. H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: \*Commerce, Training, Analysis, Scientific research, Economics, Research program administration, Instruction manuals.  
Identifiers: \*Marketing research.

Contents: Basis of marketing research; Types of marketing research; Basic procedures and methods of marketing research; Situation analysis and informal investigation; Planning and preparing for the final research; Collection, tabulation, and analysis of data; Interpretation and presentation of data follow-up; General review - case studies.

**PB-177 972** **PC A06 MF A01**  
Agency for International Development, Washington, D. C. Communications Resources Div.  
**Leather Chemistry for Foremen. First Year Course.**  
1962, 121p Rept no. Training Manual-119  
Prepared in cooperation with Lawrence (A. C.) Leather Co., Peabody, Mass., and Lowell Technological Institute, Mass.

Descriptors: \*Leather, Chemical engineering, Atoms, Molecules, Symbols, Chemical reactions, Metals, Solutions, Ionization, Atomic structure, Hydrocarbons, Methane, Alcohols, Aldehydes, Ketones, Acids, Esters, Fatty acids, Waxes, Amines, Carbohydrates, Aromatic compounds, Halogen compounds, Dyes, Processing, Molecular structure.

Contents: Atoms and molecules; Symbols and formulas; Some non-metallic elements; Chemical reactions; Chemical arithmetic; Metals; Solutions; Ionization; Atomic structure; Introduction - structural theory; Hydrocarbons and methane series; Alcohols; Aldehydes, ketones, acids, esters; Fats, oils

and waxes; Amines; Carbohydrates; Aromatic amines; Halogen compounds; and Dyes and dyeing.

**PB-177 973** **PC A06 MF A01**  
Agency for International Development, Washington, D. C. Communications Resources Div.  
**Leather Chemistry for Foremen. Second Year Course.**  
Albert E. Chouinard. 1962, 121p Rept no. Training Manual-120  
Prepared in cooperation with Lowell Technological Institute, Mass., and Lawrence (A. C.) Leather Co., Peabody, Mass.

Descriptors: \*Leather, Chemical engineering, Hair, Skin, Proteins, Enzymes, Bacteria, Pickling, Quantitative analysis, Hydrolysis, PH, Oxidation-reduction reactions, Chromium, Tanning, Dyes, Coatings, Neutralization, Colloids.

Contents: Skin structure; Protein chemistry and soaking; Liming; Unhairing; Conditioning effects in liming; Enzymes, bacteria and bating; Bating; Pickling; Quantitative analysis; Hydrolysis equilibria; PH and oxidation reduction; Decreasing; Chromium - The werner co-ordination theory; Chrome complexes and olation; Chrome liquors; Two-bath process and neutralization; Chrome tanning theories - emulsions; Fatliquoring - stuffing and emulsions; Emulsion theories; Surface chemistry; Dyeing and coloring; Protective and decorative coatings.

**PB-177 974** **PC A04 MF A01**  
Agency for International Development, Washington, D. C. Communications Resources Div.  
**Leather Chemistry for Foremen. Third Year Course.**  
Albert E. Chouinard. 1962, 53p Rept no. Training Manual-121  
Prepared in cooperation with Lawrence (A. C.) Leather Co., Peabody, Mass., and Lowell Technological Inst., Mass.

Descriptors: \*Leather, Chemical engineering, Instruction manuals, Solutions, Standards, Volumetric analysis, Chemical indicators, Chromates, Tanning, Histology, Histological techniques, Dyes, Colors, Finishes + finishing, Processing.

Contents: Weighing-- Measuring - standard solutions; Standard solutions; pH measurements and indicators; Volumetric analysis; Water analysis; Determination of hide substance; Determination of chromic oxide in leather; Analysis of leather; Analysis of vegetable tanning materials; Histology - the study of tissues, the microscope, the technique of slide making, special tests in leather microscopy; Beam house operations; Tanning; Retanning; Dyeing and fatliquoring; Formulation of three brown colors; Finishing.

**PB-177 981** **PC A05 MF A01**  
Agency for International Development, Washington, D. C. Communications Resources Div.  
**Leather Technology.**  
1962, 86p Rept no. Training Manual-140

Descriptors: \*Leather, Processing, Instruction manuals, Tanning, Dyes, Lubrication, Skin, Curing agents, Colors, Costs.

Contents: Introduction; Hides and skins; Soaking and unhairing; Liming, beaming and splitting; Acids and alkalies and the pH system of measuring their strength; Tanning; Vegetable tanning; Leather lubrication; Drying and pasting; Dyes and coloring; Economics in the leather industry; Workshop on upper leather; Leather machinery terms.

**PB-178 062** **PC A03 MF A01**  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Plant Requirements for Manufacture of Pharmaceutical Products.**  
Sep 61, 50p

Descriptors: \*Management planning, \*Pharmacology, \*Manufacturing methods, \*Instruction manuals, Budgets, Safety, Costs, Money, Personnel, Training, Law, Site selection, Production, Manpower, Economics, Machines.



## APPROPRIATE TECHNOLOGY ABSTRACTS

The purpose of this report is to present basic information for establishing a plant in a foreign country to produce pharmaceutical products. The term pharmaceutical products includes tablets; pills, coated and uncoated; and capsules. (Author)

**PB-178 063** PC A05 MF A01  
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.  
**Training Course in Marketing.**  
Mar 60, 97p Rept no. Technical Bull-61

Descriptors: \*Management planning, \*Instruction manuals, \*Commerce, Training, Time, Distribution, Storage, Handling, Training, Money.  
Identifiers: Advertising.

Contents: Introduction - important parts of marketing; Marketing research; Pricing policies; Advertising; Channels of distribution; Selling; Storage and warehousing; and Payment.

**PB-178 064** PC A04 MF A01  
International Cooperation Administration, Washington, D. C. Technical Aids Branch.  
**Management Primer: Principles and Practices of Productivity - Records and Reports.**  
May 62, 53p Rept no. Training manual-96

Descriptors: \*Management planning, Reports, \*Instruction manuals, Reports, Public opinion, Accuracy, Standardization, Classification, Manpower, Law, Records, Handling, Production, Costs, Money.  
Identifiers: Accounting.

Written records are the memory of management. They preserve facts and figures by setting them down in writing for future use. Without records and the experience they preserve there would be no scientific management today. Recorded experience helps management in the planning and scheduling of its operations. By comparing recorded performance with planned performance supervisors can control the progress of enterprise activities. And, by using records to obtain detailed information on all enterprise developments, businessmen can base their decisions on experience and thus reduce the risks of misjudging enterprise strength. Records also protect management against legal difficulties, because they create and preserve evidence on internal and external transactions that may be questioned by the public, by government, by the courts, or by other enterprises. (Author)

**PB-178 341T** PC A02 MF A01  
National Tillage Machinery Lab., Auburn, Ala.  
**Investigation of Active Working Tools of Subsoil Irrigation Machines.**  
V. P. Chalyi, and V. S. Burd. 28 Apr 68, 4p  
Trans. of Traktory i Selkhoz mashiny (USSR) n9 p30-1 1966, by William R. Gill.

Descriptors: \*Earth-handling equipment, Agriculture, \*Irrigation systems, \*Agriculture, Rural areas, USSR, Water, Soil mechanics, Tractors.  
Identifiers: Graphs(Charts), Translations.

Subsoil irrigation differs from the conventional method of irrigation in that water, together with fertilizers and chemicals, is introduced directly in the subsoil horizon with the help of a special tool. The working tool forms a fluctuating shaped mole cavity at a depth of 20-35 cm. Great depth of covering water by the accepted line of machines (4-6 rows) and the loosening of the compact subsoil horizon creates difficulty in matching subsoil irrigation machines with the manufactured lines of cultivator tractors because of inadequate tractive power. Therefore decreasing the tractive resistance of the working tool is a real problem. Proceeding from this it is expedient to use active working tools in subsoil irrigation machines. (Author)

**PB-178 347T** PC A03 MF A01  
National Tillage Machinery Lab., Auburn, Ala.  
**The Problem of Basic Parameters of Tillage Tools for Primary Soil Tillage, Chapter II.**  
A. T. Vaginym. 10 Mar 68, 45p  
Trans. of mono. Voprosy Selskhozyaistvennoi Mekhaniki, Minsk, 1967 p57-98, by William R. Gill.

Descriptors: \*Earth handling equipment, \*Agriculture, Rural areas, Tractors, USSR, Mathematical analysis, Shear stresses, Soil mechanics, Tables.  
Identifiers: Plowshares, Graphs(Charts), Translation.

There are six basic systems interactions of the operating tools of plowshare type plows with the soil: The action of one body alone without supplementary working tools; The operation of the basic body in conjunction with a skim coulter; The operation of the basic body with a stationary jointer stripping the upper field corner of the slice; The operation of the basic body with supplementary working tools decreasing the bottom furrow angle; Two-level plowing; and Three-level plowing. (Author)

**PB-178 373T** PC A02 MF A01  
National Tillage Machinery Lab., Auburn, Ala.  
**Determination of the Optimum Parameters of Rotary Tiller Cultivation Equipment.**  
V. S. Surilov. 3 May 68, 13p  
Trans. of Vsesoyuznyi Nauchno-Issledovatel'skii Institut Mekhanizatsii Selskogo Khozyaistva, Moscow. Sibirskii Filial. Nauchnye Trudy (USSR) n3 p185-94 1966, by William R. Gill.

Descriptors: \*Earth-handling equipment, \*Agriculture, Rural areas, Costs, Cost effectiveness, Economics, Tractors, Mathematical analysis, USSR, Soil mechanics.  
Identifiers: Graphs(Charts), Rotary tillers, Translations.

The effectiveness of agricultural machines and tools depends on the extent their parameters suitably characterize the technological process of the worked media and the conditions of employment of a given machine. The basic parameters of rotary tiller row crop cultivators are: the width of cut B, forward speed V, and feed to the knife S. To supplement the parameters of the equipment we also take the mechanical efficiency and the coefficient of resistance to movement. The important qualities of the machine depend on the basic parameters of the equipment: the specific productivity, the specific cost, agrotechnical level of the treatment. (Author)

**PB-179 304** PC A05 MF A01  
Hawaii Architects and Engineers, Inc., Honolulu.  
**Pre-Final Submission for Ebeye and Carlson, Marshall Islands: Trust Territory Physical Planning Program.**  
Summary plan.  
12 Jan 68, 90p\*  
See also PB-179 303.

Descriptors: \*Urban planning, \*Kwajalein Atoll, Urban areas, Rural areas, Transportation, Population, Social sciences, Budgets, Power, History.  
Identifiers: Ebeye, Carlson, Land use.

Contents: Concept of the plan and its elements - Ebeye and Carlson (Transportation, Land use, Community facilities, Community appearance, Utilities, Budget cost proposals, Implementation); Existing conditions, trends, and opportunities; Historical and environmental influences.

**PB-179 305** PC A06 MF A01  
Hawaii Architects and Engineers, Inc., Honolulu.  
**Pre-Final Submission for Saipan, Mariana Islands: Trust Territory Physical Planning Program.**  
Summary plan.  
12 Jan 68, 113p\*  
See also PB-179 304.

Descriptors: \*Urban planning, \*Micronesia, Urban areas, Rural areas, Transportation, Social sciences, Budgets, History, Power.  
Identifiers: Saipan, Mariana Islands, Land use.

Contents: Concept of the plan and its elements (Transportation, Land use, Community facilities, Community appearance, Utilities, Budget cost proposal, Implementation); Existing conditions, trends, and opportunities; Historical and environmental influences.

**PB-179 327** PC A08 MF A01  
Texas Transportation Inst., College Station.

**Handbook for Building Homes of Earth.**  
Lyle A. Wolfskill, Wayne A. Dunlap, and Bob M. Gallaway. 1968, 160p\* Rept no. Bull-21  
Prepared in cooperation with Housing and Home Finance Agency, Washington, DC.

Descriptors: \*Housing, Soils, \*Soils, Construction, Handbooks, Stabilization, Earth-handling equipment, Foundations(Structures), Walls, Compacting, Compressive properties, Tensile properties, Floors.  
Identifiers: Adobe, Roof.

Contents: Introduction-types of earth houses; Soils and what can be done with them; Soil stabilizers; Site preparation; Foundations; Lightweight roofs; Getting the soil prepared; Making adobe blocks; Making pressed earth blocks; Making walls of pressed blocks; Making walls of rammed earth; Roofs for earth houses; Floors for earth houses; and Surface coatings.

**PB-179 329** PC A04 MF A01  
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.  
**Village Housing in the Tropics.**  
Jane B. Drew. Jun 67, 71p  
Prepared in cooperation with Agency for International Development, Washington, DC.

Descriptors: \*Housing, Africa, Public health, Hygiene, Protection, Water supplies, Insects, Contamination, Soils, Erosion, Rivers, Animals, Economics, Agriculture, Wind, Construction materials, Design, Ventilation, Tropical regions.  
Identifiers: West Africa.

Agriculture is the foundation of wealth in West Africa. The concomitant of agriculture is villages. The creation of efficient villages where a high standard of life is possible is a prime town planning responsibility of the coast. The stabilization of an agriculture based on the rotation of crops rather than shifting cultivation will help the permanent location of villages as well as combat two great evils: soil erosion caused by heedless destruction of the forests, and soil impoverishment. Mining and fishing villages have not been dealt with separately since their location is fixed, but in general they follow the same principles outlined for other villages. In siting a village the obvious factors controlling its position are farming land, water, and accessibility to main roads, or sometimes to sea or streams. (Author)

**PB-179 359** PC A04 MF A01  
Department of Housing and Urban Development, Washington, D. C.  
**Urban Planning in Developing Countries.**  
Ideas and Methods Exchange No. 61  
Lloyd Rodwin. 1968, 68p

Descriptors: \*Urban planning, Venezuela, \*Management planning, Urban areas, Housing, Population, Transportation, Industries, Site selection, Terrain, Control, Natural resources, Petroleum, Roads, Buildings, Economics.  
Identifiers: AID(Agency for International Development), Ciudad Guyana(Venezuela).

The study describes the job of the city planner in developing countries. It does this by examining a single case, the planning of Ciudad Guayana, a city being built in Venezuela, and it looks at this city planning endeavor from two points of view. It examines this still on-going enterprise from the standpoint of urban planning technique - how does the urban planner in such a setting do his work. - and in addition, it tries to suggest something of the functions which such an urban planning enterprise may have in a developing country. For while certain features of the case described are characteristic only of Venezuela, or of the problems of new cities, many of the problems confronted and techniques used are relevant to urban, regional and national programs throughout the world. (Author)

**PB-179 361** PC A03 MF A01  
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.  
**Plant Requirements for Manufacture of Building Bricks.**  
Jun 67, 34p



## APPROPRIATE TECHNOLOGY ABSTRACTS

Descriptors: \*Brick, \*Manufacturing methods, Industrial plants, Costs, Labor, Specifications, Machine tools, Site selection, Buildings, Money, Budgets, Industrial production, Clay, Shale, Mud, Driers(Apparatus), Inventory, Economics, Tropical regions.  
Identifiers: Area planning aid development.

The purpose of this report is to present basic information for establishing and operating a building brick plant in a country with a tropical or semi-tropical climate. The information includes general manufacturing methods, plant layout, and costs of materials, equipment, and labor. The plant described is considered to be the economic minimum in size which utilize suitable equipment and methods. Products are to be simple and varieties limited in order that costs may be kept to a minimum. (Author)

**PB-179 363** **PC A02 MF A01**  
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.  
**Housing in Liberia.**  
Jun 67, 20p\*  
Country Report Series.

Descriptors: \*Economics, Africa, \*Housing, Africa, Geography, Climatology, History, Political science, Population, Agriculture, Mining engineering, Transportation, Communication systems, Commerce, Construction materials, Labor, Professional personnel, Urban planning, Rural areas, Law, Banking, Costs, Foreign aid, Statistical data.  
Identifiers: Liberia, Area planning and development.

The report on housing in Liberia is one of a series of reports on housing and related subjects in developing countries. The series is issued by the Office of International Housing (OIH) of the Housing and Home Finance Agency (HHFA) as a service to the Agency for International Development (A.I.D.). The individual country reports are designed to assist in the orientation of A.I.D. technicians either in the United States or abroad. They are also intended to provide basic information to consultants scheduled to undertake overseas assignments as well as to American businessmen interested in foreign investment. (Author)

**PB-179 365** **PC A04 MF A01**  
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.  
**Housing in the Ivory Coast.**  
Thomas R. Callaway. Apr 66, 62p\*  
Country Report Series.

Descriptors: \*Economics, Ivory Coast, \*Housing, Ivory Coast, Geography, Climatology, History, Political science, Population, Employment, Transportation, Banking, Construction materials, Prefabricated buildings, Costs, Sanitary engineering, Labor, Wages, Rural areas, Urban planning, Foreign aid, Statistical data.  
Identifiers: Area planning and development.

No abstract available.

**PB-179 366** **PC A02 MF A01**  
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.  
**Housing in Nigeria.**  
Jun 67, 18p\*  
Country Report Series.

Descriptors: \*Economics, Nigeria, \*Housing, Nigeria, Geography, Climatology, History, Political science, Population, Construction materials, Professional personnel, Urban planning, Rural areas, Law, Foreign aid, Banking, Costs, Statistical data.  
Identifiers: Area planning and development.

No abstract available.

**PB-179 367** **PC A04 MF A01**  
Department of Housing and Urban Development, Washington, DC. Office of International Housing.  
**Housing in Ethiopia.**  
Country Report Series.  
Jan 66, 71p\*

Descriptors: \*Economics, Ethiopia, \*Housing, Ethiopia, Geography, Climatology, History, Political science, Education, Population, Agriculture, Mining engineering, Industries, Transportation, Communication systems, Commerce, Banking, Construction materials, Urban planning, Rural areas, Costs, Manpower, Wages, Statistical data.  
Identifiers: Area planning and development.

No abstract available.

**PB-179 370** **PC A06 MF A01**  
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.  
**Proposed Minimum Standards for Permanent Low-Cost Housing and for the Improvement of Existing Substandard Areas.**  
Harold Robinson. May 66, 107p\*

Descriptors: \*Housing, Standards, Latin America, Buildings, Law, Performance(Engineering), Heating, Construction, Sanitary engineering, Electrical equipment, Fire safety, Public health, Management planning, Design.  
Identifiers: Underdeveloped countries, Area planning and development, Plumbing.

At the request of the Latin America Bureau, Agency for International Development, these proposed minimum standards were developed by the Division of International Affairs, Department of Housing and Urban Development, for use in Latin America. They are based principally on codes, ordinances and standards obtained from countries in Central and South America and the Caribbean Area, and on discussions with officials and technicians of selected countries in these regions. In so far as possible, they are performance standards, rather than specification standards and thus are generally applicable to the entire region. These standards are not to be construed as 'desirable standards', but rather are intended to meet only the minimum basic needs of families of low income. Their purpose is, however, to provide these families with a dwelling which is structurally safe, reasonably durable and which will not require excessive maintenance or repair during the life of the mortgage. They are also intended to provide a decent environment and to serve as a guide to improving, at least on a temporary basis, substandard areas which lack even the minimum of amenities, or a semblance of order.

**PB-179 376** **PC A03 MF A01**  
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.  
**Squatter Settlements. The Problem and the Opportunity.**  
Ideas and Methods Exchange no. 63, 302 Urban Planning  
Charles Abrams. Apr 66, 49p

Descriptors: \*Urban areas, Housing, Social sciences, Law, Economics, Population, Public opinion, Sewage, Urban planning, Advanced planning, Costs, Safety, Site selection, Employment, Public health, Structures, State-of-the-art reviews.  
Identifiers: Area planning and development, \*Squatters.

The report discusses the world-wide problem of 'squatters' in urban slums. The legal and economic problems associated with squatter villagers are examined.

**PB-179 383** **PC A03 MF A01**  
Department of Housing and Urban Development, Washington, DC.  
**Sewage Lagoons for Developing Countries.**  
Ideas and Methods Exchange No. 62, 302/12/1 Sewage Lagoons.  
Thomas Callaway, and Bernard Wagner. Jan 66, 41p  
Prepared in cooperation with Department of State, Washington, DC. Agency for International Development.

Descriptors: \*Urban planning, \*Wastes(Sanitary engineering), Sewage, Wastes(Industrial), Rural areas, Housing, Humans, Drainage, Irrigation systems, Water, Site selection, Soil mechanics, Evapotranspiration, Advanced planning, Public health.

Identifiers: BOD(Biochemical oxygen demand), Area planning and development, Sewage lagoons.

Many cities in developing countries lack acceptable community sewage disposal systems. The failure to provide safe, effective means of disposing of human and other wastes present problems, the seriousness of which cannot be overestimated. The cost of constructing adequate treatment plants often discourages their installation in cities with limited budgets. However, treatment is possible by means of sewage lagoons which are usually less expensive than more conventional methods. (Author)

**PB-179 385** **PC A06 MF A01**  
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.  
**Manual on Design for Low-Cost and Aided Self-Help Housing.**  
Ideas and Methods Exchange No. 37  
Wolcott C. Waggaman, and Robert Dodge. Jun 67, 111p

Descriptors: \*Housing, Construction, \*Construction, Handbooks, Management planning, Design, Costs, Central America, West Indies, Puerto Rico, Cambodia, Iran, Surinam, Industrial training, Chile, China, Greece, Specifications, Construction materials, Organizations.  
Identifiers: Area planning and development, Self-help housing, Low-cost housing, Community action programs.

Since World War II, the desires--and real needs--for better homes have intensified. For economic, social, and political reasons great interest has developed in improving shelter for the ill-housed majority of the people of the world. In many countries, families, except those in the higher income group, build the houses they occupy. Self-help is the accepted way to build a house using local, readily available materials and the labor of each family. The basic principles of good design for aided self-help are really no different than those of good design anywhere. Effective arrangement; simple construction techniques; and efficient use of labor and materials, all considered in proper relation to local conditions, customs, desires, and taboos, can go far toward providing durable, livable houses within available money resources. (Author)

**PB-179 408** **PC A03 MF A01**  
National Council on the Aging, Inc., New York.  
**Operation III: Loaves and Fishes. A Model Community Action Program to Provide Nutritious Low-Cost Meals to the Elderly.**  
Final rept.  
Geneva Mathiasen, and Jack Ossofsky. 23 Jul 56, 34p  
Contract OEO-79

Descriptors: \*Food, \*Adults, Costs, Sociology, Aging(Physiology), Employment, Training, Education, Nutrition, Costs.  
Identifiers: Loaves and fishes operation.

The major purpose of this project is to provide nutritious meals and footstuffs at low cost to older persons living on marginal or poverty level incomes. Meals will be prepared so that they may be eaten where purchased, or packaged so they may be carried home or delivered to the homebound when necessary. In addition to providing meals, the project will seek to stretch the limited incomes of the elderly through implementation of surplus food programs, food stamp plans, and the development of marketing, home economics and related consumer education. Social action in connection with matters of consumer concern and protection will be encouraged. The project will provide employment opportunities for residents of the community being served, including the elderly, as well as opportunities for volunteer services by those who can afford to give of their time. Intensive community relations and case finding will be undertaken to insure maximum utilization of the program by the elderly. (Author)

**PB-179 475** **PC A08 MF A01**  
Memphis and Shelby County Planning Commission, Memphis, Tenn.



## Community Facilities Study. Volume III. Sanitary Sewers.

Comprehensive planning rept.

Feb 68, 164p\*

See also Volume 2, PB-179 474. Prepared in cooperation with Allen and Hoshall-Clark, Dietz and Assoc., Memphis, Tenn. PORTIONS OF THIS DOCUMENT ARE ILLEGIBLE. SEE INTRODUCTION SECTION OF THIS ANNOUNCEMENT JOURNAL FOR CFSTI ORDERING INSTRUCTIONS. Availability: Original document in color until exhausted.

Descriptors: \*Urban planning, Tennessee, \*Sanitary engineering, Tennessee, Sewage, Predictions, Construction, Costs, Population, Rivers, Maps, Urban areas, Rural areas, Water pollution, Wastes(Industrial).

Identifiers: Area planning and development, Land use, Memphis(Tennessee), Evaluation, \*Interceptor sewers, Shelby County(Tennessee).

Described in this report are the lengths, sizes and approximate locations of sanitary sewers needed to provide service to Shelby County through the year 1990. The results of an extensive investigation of the existing interceptor sewers in the County is also included. The construction of the needed sewers is divided into five-year increments beginning in 1970. Sewer capacity was determined by studying population forecasts and land use predictions for the County. Estimated construction costs for each phase are presented with unit costs being forecast for the future based on previous construction data. A detailed study of the sewage treatment needs for the County is currently being prepared for the City of Memphis, however, preliminary costs of these facilities are included in the report. (Author)

## PB-180 245 PC A03 MF A01

Cooperative League of the USA, Chicago, Ill.

### Potential Cooperative Projects.

Final feasibility rept.

Stanley Dreyer. 28 Dec 65, 28p

Contract OEO-598

Descriptors: \*Organizations, Feasibility studies, Standards, Management planning, Urban areas, Rural areas, Budgets, Training.

Identifiers: Cooperative projects, Community action programs, Chicago(Illinois), St.

No abstract available.

## PB-180 476 PC A03 MF A01

Clapp and Mayne, Inc., San Juan, Puerto Rico.

### Feasibility Study for Establishing a Bicycle Manufacturing Plant in Puerto Rico.

Final rept.

Dec 68, 44p

Contract DC-8-35352

Descriptors: \*Industrial plants, \*Vehicles, \*Puerto Rico, Industrial plants, Feasibility studies, Economics, Commerce, Assembling, Production, Costs.

Identifiers: Bicycles.

A study was made to establish the economic feasibility of manufacturing bicycles to satisfy the small but growing internal Puerto Rican market. However, during the course of the investigation, the Consultants became aware of a series of developments in the United States bicycle market that, upon further investigation, led them to broaden the original scope of the study to include an evaluation of the feasibility of producing bicycles in Puerto Rico for sale in this market and for shipment to the United States. Nonetheless, the original concept of a local market-oriented factory has been kept intact, so the study provides an evaluation of that possibility independently of an export market. (Author)

## PB-180 509 PC A06 MF A01

Johns Hopkins Univ., Baltimore, Md. Dept. of Sanitary Engineering and Water Resources.

### An Evaluation of the Problems of Sanitary Sewer System Design.

Final rept.

John C. Geyer, and John J. Lentz. Sep 64, 114p\* FHA-564

Technical studies publication.

Descriptors: \*Sanitary engineering, Sewage, \*Wastes(Sanitary engineering), Pipes, Water supplies, Housing, Maintenance, Costs, Urban areas, Rural areas, California, Maryland, Florida, Missouri.

Identifiers: Evaluation, \*Sewer systems.

General problems facing sewer designers have been studied using field data collected in four U. S. communities. Analysis of these data indicates that basic causes of maintenance difficulties are tree roots, accumulations of debris in the absence of roots, other causes, and in areas having cohesionless sub-soil, sewer cave-ins. Proportionately fewer blockages occur when grades are moderate, and proportionately more occur at the upper terminals of the sewers. In eight-inch pipe, manhole spacing has little effect on the labor costs of stoppage relief. Emphasis is placed on statistical techniques for estimating domestic sewage flow. Flow of rainwater and groundwater was at times found to be excessive in all systems studied. Limited data on costs of operating and maintaining sewage pumping stations are reported and evaluated. (Author)

## PB-182 735 PC A02 MF A01

Department of Forestry and Rural Development, Vancouver (British Columbia). Forest Products Lab.

### Wood Species and Glues Influence Plywood Bond Durability.

Information rept.

P. L. Northcott. Aug 68, 24p\* Rept no. VP-X-42

Descriptors: \*Plywood, \*Bonding, Wear resistance, Adhesives, Specifications, Thickness, Roughness, Classification, Exposure, Regression analysis, Degradation, Loading(Mechanics), Effectiveness.

Identifiers: Graphs(Charts).

The research demonstrates that durability of 3/8 in., 3-ply plywood manufactured with a single glue is strongly dependent on the species of wood. Furthermore, the influence of species on durability tends to be different for each type of glue. Twelve 4'-square panels of plywood were manufactured from each of the combinations of six species of wood and ten glues. Plywood shear specimens were subjected to each of six bond-degrading systems for times up to 160 days. (Author)

## PB-182 764 PC A02 MF A01

Department of Forestry and Rural Development, Vancouver (British Columbia). Forest Products Lab.

### Balsam Woolly Aphid-Infested Abies Wood as a Source of Pulp Fibre.

Information rept.

K. Hunt. May 68, 25p\* Rept no. VP-X-39

Descriptors: \*Hemiptera, Wood, \*Wood pulp, Sources, Trees, Pest control, Chemicals, Life cycle, Damage, Eggs, Wind, Airborne, Climatology, Physical properties, Cell wall, Economics, Canada.

Identifiers: Adelges piceae, Fir trees.

The life cycle of the balsam woolly aphid (Adelges piceae Ratzeburg) and its effect on trees and wood of various Abies species is briefly described. Several methods, natural and chemical, for controlling the pests are cited. The effect of advanced infestation on the quality of pulp produced from Abies wood by the different industrial processes is shown to include a reduction in yield of 10% and a decrease in strength of 20 to 30%. Recommendations regarding further pulping research are made in the light of various economic considerations. It is recommended that a detailed polysaccharide analysis be carried out on the aphid-infested wood of Abies balsamea. (Author)

## PB-184 123 HC A09 MF A01

Kaiser Engineers, Oakland, Calif.

### In-Cities Experimental Housing Research and Development Project, Phase I. Composite Report. Volume III. technology.

Mar 69, 181p\* Rept no. KE-69-8-R-4

Contract HUD-H-1011

Compiled from Phase I reports prepared by Building Systems Development, Inc., Contract HUD-H-971; Westinghouse Electric Corp., Contract HUD-

H-970; and Abt Associates, Inc., Contract HUD-H-969. See also Volume 2, PB-184 122 and Volume 4, PB-184 124.

Descriptors: \*Urban planning, Housing projects, Construction, Urban areas, Design, Configuration, Materials, Structural parts, Manufacturing methods, Assembling, Cooling, Heating, Electrical equipment, Industries, Indexes.

Identifiers: \*Modular construction, \*Low cost housing.

The objective of this report is to present for public information the useful data on technological innovation in low-cost housing collected by the three Phase I Contractors. During Phase I, a large file of data on innovative systems and components was accumulated. Some of these systems and components had been tested and others were in the design stage only. Some had been used in foreign countries but not in the United States. This file of data has been assembled in this volume for use as a general guide to those concerned with the planning and construction of low-cost housing. (Author)

## PB-184 240 HC A02 MF A01

Tropical Products Inst., London (England).

### The Market for Kenaf in the United Kingdom.

J. L. Allen. Apr 69, 23p\* Rept no. G40

Descriptors: \*Fibers(Natural), Commerce, Economics, Production, Standardization.

Identifiers: Kenaf, Jute.

The report evaluates the market potential for kenaf in the United Kingdom. Kenaf is the trade name for the fiber obtained from the stems of two species of Hibiscus. The uses, production, trade, grading, and future prospects for kenaf are discussed along with its competitor, jute.

## PB-184 450 HC A07 MF A01

Mater Engineering Corvallis, Oreg.

### A Feasibility Study for a Small LOG Sawmill on the Fort Apache Indian Reservation in Central Arizona.

Apr 69, 137p\*

Contract C-8-3529

Descriptors: \*Wood, Cutting, \*Industrial plants, \*Arizona, Rural areas, Feasibility studies, Industrial production, Forestry, Sources, Costs, Configuration, Operation, Predictions, Economics, Sociometrics.

Identifiers: Indian reservations, \*Sawmills, Fort Apache(Arizona).

The study investigated the feasibility of constructing an additional sawmill facility on the Fort Apache Indian Reservation to saw small logs which the existing mill cannot handle profitably. The study included a survey of the wood supplies and the selection of the optimum log conversion configuration to profitably convert the available small logs into saleable lumber and chips. Eight configurations were studied for converting the small logs to lumber. An in-depth analysis resulted in projected operating statements which indicate that this small log mill should be economically advantageous to the Tribe. (Author)

## PB-184 876 HC A09 MF A01

National Bureau of Standards, Washington, D.C. Inst. for Applied Technology.

### The Performance Concept: A Study of Its Application to Housing. Volume Two.

John P. Eberhard. 3 Jun 69, 194p\*

Revision of Rept. no. NBS-9850 dated 3 Jun 68. See also Volume 1, PB-184 458, and Volume 3, PB-184 459. Sponsored in part by Department of Housing and Urban Development, Washington, D.C.

Descriptors: \*Housing, Standards, Design, Specifications, Costs, Structural properties, Rural areas, Management planning, Decision making, Economics, Money, Law, Public health, Life expectancy, Sociology, Alaska.

Identifiers: Low cost housing, Poverty, Ethnic groups, Indian reservations, Problem solving, Building codes.



# APPROPRIATE TECHNOLOGY ABSTRACTS

This report, in three volumes, is the result of a study conducted by the Institute for Applied Technology of the National Bureau of Standards for the Department of Housing and Urban Development. This study investigated the following hypothesis: 'It is hypothesized that, if adequate performance standards for low-cost housing could be developed, and if they were broadly used, an important and fundamental way would have been opened to accommodate the introduction of cost-reducing innovations into the design of low-cost housing.' The report finds this hypothesis to be generally correct, but emphasizes the need for the development of the necessary knowledge to implement the performance concept. This volume contains appendices titled as follows: Needs of the rural poor in low cost housing; Housing of Indians on reservations and of Alaskan natives; Conceptual structure of low cost/low income housing; Nature of the problem; Implementation of the performance concept in regulatory and acceptance systems such as the minimum property standards.

**PB-185 168** HC A05 MF A01  
Bureau of Public Roads, Washington, D.C. Environmental Development Div.  
**Literature References to Highways and Their Environmental Considerations.**  
1 Jul 69, 90p\*

Descriptors: \*Roads, \*Environment, \*Management planning, Roads, Urban planning, Rural areas, Sociology, Economics, Physical properties, Air pollution, Transportation, Bibliographies, Abstracts.  
Identifiers: Land use, Noise pollution.

The report is in four sections: a bibliography, keyed and cross-referenced to six broad areas of interest; the staff selections; the abstracts; and a subject index. (Author)

**PB-186 188** HC A08 MF A01  
National Swedish Inst. for Building Research, Stockholm (Sweden).  
**Social Aspects of Housing and Urban Development.**  
1969, 166p\* Rept no. Bygghusforskningen-3:1969  
Paper copy also available from The National Swedish Institute for Building Research, Box 27 163, S-102 52, Stockholm 27, Sweden. Sw. Kr. 20.

Descriptors: \*Urban planning, Housing, \*Housing, Bibliographies, Economics, Sociology, Africa, Asia, Australia, Central America, South America, Europe, North America, Abstracts.  
Identifiers: Low cost housing, Developing countries.

The bibliography is part of a continuing project of the Housing Section of the United Nations Centre for Housing, Building and Planning. The aim of the bibliography was to provide a broad view of the published literature dealing with the experience of countries which have made substantial progress in solving the social problems of housing and urban development, paying particular attention to such aspects as: an appropriate programme of economic development in urban and rural areas leading to an accelerated raising of the standard of living, the provision of appropriate dwellings for all, the initiation and construction of housing for low-income families, the keeping of rents within a reasonable share of family incomes, the improvement of existing housing and the clearance of slums. (Author)

**PB-186 514** HC A04 MF A01  
Andrews (George H.) Engineering Associates, Inc., Washington, D.C.  
**Plant Requirements for Manufacture of Milled Rice.**  
R. Poliakov. Sep 61, 61p  
Revision of Report prepared by Wolf Management Engineering Co., Chicago, Ill.

Descriptors: \*Cereals, Processing, \*Industrial plants, Specifications, Milling machines, Materials, Labor, Buildings, Power supplies, Water supplies, Costs, Personnel, Training, Safety, Economics, Law, Warehouses, Machines, Management engineering.  
Identifiers: Rice, Rice polisher machines.

The purpose of the report is to provide basic information for establishing a plant in a foreign country to process rice. (Author)

**PB-187 565** HC A09 MF A01  
Steffire Associates, Inc., Laguna Beach, Calif.  
**The Small New Business.**  
Final rept.  
Volney Steffire. Aug 69, 181p\*  
Contract OEO-4786

Descriptors: \*Commerce, \*Management planning, Starting, Organizations, Industries, Economics, Motivation, Money, Sociology, Production control, Predictions, Site selection, Growth, Computer programs, Costs.  
Identifiers: \*Small businesses, \*Economic development, Marketing, Product development, Accounting, Profits, Cash flow, Computer analysis.

Contents: The general problem; Finance; Marketing; Production; Organization; Starting a new small business; Growth and/or decline; The nature of a small business development company.

**PB-188 841** HC A02 MF A01  
Illinois Univ., Urbana. Water Resources Center.  
**Impact of Community Water Systems in Small Towns.**  
Final rept. 1 Sep 67-30 Jun 68  
Walter J. Wills, and Donald D. Osburn. Jun 69, 20p WRC-RR-20, OWRR-A-027-ILL(1)  
Contract DI-14-01-0001-1081

Descriptors: \*Water supplies, \*Urban areas, Management planning, Fire safety, Sanitary engineering, Installation, Rural areas, Illinois.  
Identifiers: Water consumption.

The primary purpose of this study was to describe the impact the addition of a community water system to a small town would have upon that town and the surrounding communities. The benefits of the system were recognized by the residents and some of the first round impacts were measured. Benefits observed were increases in the number of water using appliances, increases in property values, improved fire protection and sanitary conditions. (Author)

**PB-188 851** HC A07 MF A01  
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.  
**A Proposed Urban Development Program for Tegucigalpa, Honduras.**  
James A. Moore. 25 Aug 67, 134p Rept no. PASA-LA(KA)-53-67  
Sponsored in part by Agency for International Development, Washington, D.C.

Descriptors: \*Urban planning, \*Honduras, \*Housing, Urban planning, Costs, Management planning, Training, Government(Foreign), Economics.  
Identifiers: \*Tegucigalpa(Honduras), Developing nations.

The report describes an urban development program prepared for Tegucigalpa, including urban planning, public finance, public administration, and training. The program seeks to institutionalize the planning function in Tegucigalpa to enable the government to prepare, finance, and administer such plans, and to encourage local citizen participation. (Author)

**PB-188 852** HC A03 MF A01  
FCH International, Inc., Washington, D.C.  
**Housing the Campesino. A Case Study of Cooperative Housing in Rural Panama.**  
1966, 28p  
Sponsored in part by Agency for International Development, Washington, D.C.

Descriptors: \*Rural areas, Housing, \*Housing projects, \*Panama, Wages, Economics, Costs, Research program administration, Management planning.  
Identifiers: Los Pocitos(Panama), Developing nations, Low income families.

The report describes a case study of cooperative housing in Los Pocitos, Panama. It describes the

organization and administration of the housing program, the design and financing of typical houses in the project, and its applicability in other locations. (Author)

**PB-188 918** HC A05 MF A01  
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.  
**Earth for Homes: Ideas and Methods Exchange No. 22.**  
May 69, 79p\*  
Revision of report dated Sep 56.

Descriptors: \*Housing, Construction materials, \*Construction materials, \*Soils, Buildings, Construction, Soil mechanics, Walls, Floors, Roofs, Compacting, Cements, Weatherproofing, Structural properties, Finishes + finishing, Test methods, Brick, Mud, Earthquake-resistant structures, State-of-the-art reviews.  
Identifiers: \*Earth construction, Soil compacting, Soil aggregates, Admixtures, Pozzolans, Soil properties, Soil cement, Cob construction, Adobe brick, Wattle and daub.

Contents: Early uses of earth; Soils; Methods of earth wall construction; Stabilization of earth by admixtures; Earth floors; Earth roofs; Wall finishes; The design of earth walls.

**PB-188 919** HC A08 MF A01  
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.  
**Handbook for Building Homes of Earth.**  
Lyle A. Wolfskill, Wayne A. Dunlop, and Bob M. Callaway. 1970, 161p\*  
Prepared in cooperation with Texas A and M Univ., College Station.

Descriptors: \*Housing, Construction, \*Construction materials, \*Soils, Design, Soil mechanics, Site selection, Preparation, Foundations(Structures), Roofs, Walls, Floors, Manufacturing methods, Compacting, Presses(Machinery), Finishes + finishing, Weatherproofing, Handbooks.  
Identifiers: \*Earth construction, Soil tests, Soil compacting, Soil stabilization, Pressed earth blocks, Adobe blocks.

Contents: Introduction--types of earth houses; Soils and what can be done with them; Soil stabilizers; Site preparation; Foundations; Lightweight roofs; Getting the soil prepared; Making adobe blocks; Making pressed earth blocks; Making walls of pressed blocks; Making walls of rammed earth; Roofs for earth houses; Floors for earth houses; Surface coatings.

**PB-188 921** HC A04 MF A01  
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.  
**Bamboo as a Building Material.**  
F. A. McClure. Jun 67, 58p  
Revision of reports dated May 53 and Jun 67.

Descriptors: \*Housing, Construction materials, \*Construction materials, Plants(Botany), Buildings, Foundations(Structures), Supports, Floors, Walls, Doors, Roofs, Pipes, Reinforcing materials, Reinforced concrete, Abundance, Structural properties, Preservation, Construction, Small tools.  
Identifiers: \*Bamboo, Frames, Ceilings(Architecture), Windows, Troughs, Biogeography.

Contents: Parts of a house for which bamboos are suitable; Bamboo reinforcement of concrete; Geographical distribution of bamboos; Differences among species; Some bamboos used in housing; Shortcomings of bamboo and how to overcome them; Preservation; Skill requirements; Tool requirements; Differentiation and evaluation of species; Collecting specimens for identification.

**PB-188 923** HC A06 MF A01  
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.  
**Proposed Minimum Standards for Permanent Low-Cost Housing and for the Improvement of Existing Substandard Area.**  
Ideas and methods exchange.  
May 66, 107p Rept no. IME-64



## APPROPRIATE TECHNOLOGY ABSTRACTS

Descriptors: \*Housing, Standards, \*Management planning, Urban areas, Buildings, Roads, Terrain, Design, Costs, Terrain, Classification, Latin America.  
Identifiers: \*Area planning and development, Low cost housing, Low income families.

The document is concerned with proposed standards which are based on codes, ordinances, and standards in use in Latin America; however, it is felt the standards to a large degree are applicable worldwide.

**PB-188 925** HC A05 MF A01  
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.  
**Physiological Objectives in Hot Weather Housing.**

Douglas H. K. Lee. Jun 69, 83p\*  
Prepared in cooperation with Johns Hopkins Univ., Baltimore, Md. Revision of report dated May 63.

Descriptors: \*Housing, \*Tropical regions, \*Heat tolerance, Housing, Physiology, Climatology, Humidity, Temperature, Buildings, Configuration, Reflection, Cooling, Solar radiation, Heat transfer.

The report presents an introduction to hot weather housing design. Hot dry and hot humid environments are included. (Author)

**PB-188 926** HC A04 MF A01  
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.  
**Village Housing in the Tropics, with Special Reference to West Africa.**  
Keith H. Hinchcliff. Jun 69, 72p  
Prepared in cooperation with Illinois Univ., Urbana. Revision of report dated May 63.

Descriptors: \*Housing, Tropical regions, \*Urban planning, \*Subsaharan Africa, Site selection, Climatology, Terrain, Problem solving, Water supplies, Public health, Buildings, Construction materials, Culture, Nigeria, Ghana.  
Identifiers: Villages, Community facilities, Sierra Leone, Gambia.

The document discusses the optimum location of villages, types of village layouts, housing design, and community facilities, with special reference to West Africa.

**PB-188 927** HC A03 MF A01  
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.  
**Bibliography on Housing Building and Planning.**  
May 69, 47p\*

Descriptors: \*Housing, \*Bibliographies, Construction, Law, Standards, Urban planning, Rural areas, Terrain, Problem solving, Abstracts.  
Identifiers: Self help housing, Architecture, Building codes.

The document contains an annotated listing of recent books and periodicals on aided self-help housing, architecture, building codes and standards, city and regional planning, housing, land problems, taxation, transportation, urbanization and zoning.

**PB-188 931** HC A04 MF A01  
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.  
**Aided Self-Help in Housing Improvement.**  
Ideas and methods exchange.  
Aug 69, 64p\* Rept no. IME-18  
Revision of report dated Jan 67.

Descriptors: \*Housing, Construction, \*Sociometrics, \*Rural areas, Management planning, Costs, Labor, Standards, Construction materials, Terrain, Burma, Jamaica, Puerto Rico, Greece, Taiwan, Sweden.  
Identifiers: Self help housing, Community development, Technical assistance.

The document discusses fundamental principles and role of aided self-help housing and how to organize self-help projects and secure technical and

financial assistance. It describes programs in Burma, Jamaica, Puerto Rico, Greece, Taiwan and Sweden.

**PB-189 171** HC A05 MF A01  
Hawaii Univ., Honolulu. Water Resources Research Center.  
**Identification of Return Irrigation Water in the Subsurface: Water Quality.**  
Project completion rept. 1 Jul 68-30 Jun 69  
Pedro A. Tenorio, Reginald H. F. Young, and H. Collins Whitehead. Oct 69, 92p TR-33, OWRR-B-012-HI(1)  
Contract DI-14-01-001-1495  
Report on Identification of Irrigation Return Water in the Subsurface - Phase II.

Descriptors: \*Water supplies, \*Hawaii, \*Irrigation systems, Water supplies, Quality control, Agriculture, Water wells, Sampling, Nitrates, Phosphates, Bromides, Carbonates, Fluorides, Calcium compounds, Magnesium compounds, Silicates, Sulfates, Rainfall, Chemical analysis, Solids, Tropical regions.  
Identifiers: Pearl Harbor(Hawaii), Irrigation return water, \*Oahu Island.

A joint research effort was undertaken by the Water Resources Research Center and the Honolulu Board of Water Supply to investigate the physical and chemical characteristics of irrigation return water in Pearl Harbor-Waipahu, Oahu, an area used for tropical agriculture. The project was started in 1967 and was expanded in 1968 to include Kahuku, Oahu and Central and West Maui. Well samples and profile samples were obtained with a thief sampler in the Pearl Harbor-Waipahu area and composite samples were obtained mainly from pumping wells in other areas. In addition, both spring and stream waters in the Pearl Harbor-Waipahu area were analyzed for a number of inorganic constituents. Stream waters in the main study area were observed to contain appreciable quantities of nitrate, phosphate, bromide, bicarbonate, and fluoride. Similar trends were observed with the spring samples including increases of calcium, magnesium, silica, sulfate, and nitrate. Well waters from the main study area were evaluated according to Visher and Mink's index constituents, silica, sulfate, and nitrate, and other significant ionic compositions. General analysis of major constituents evidenced a cyclical trend in concentration, either related to seasonal rainfall and irrigation practices, or both. (WRISIC abstract)

**PB-189 254** HC A02 MF A01  
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.  
**Establishing Savings and Loan Associations in Less Industrialized Countries.**  
Ideas and methods exchange  
Ray J. Burroughs. 1967, 16p Rept no. IME-38

Descriptors: \*Banking, Organizations, \*Housing, Management planning, Government(Foreign), Standards, United States, Law, Personnel, Site selection, Reliability.  
Identifiers: \*Savings and loan associations, Developing countries, Expenses, Income.

U.S. savings and loan associations are used as an example for other countries desiring to establish financing institutions for funding new houses. Enabling legislation, interest, institution sponsorship, staffing, location and liquidity are all briefly discussed. (Author)

**PB-189 255** HC A06 MF A01  
Bureau of Water Hygiene, Rockville, Md.  
**Guidelines and Criteria for Community Water Supplies in the Developing Countries.**  
1969, 108p

Descriptors: \*Water supplies, Management planning, \*Management planning, Government(Foreign), Instruction manuals, Public health, Industries, Agriculture, Costs, Construction, Standards, Training, Maintenance, Quality control, Asia, Latin America.  
Identifiers: Water resources, Developing countries, AID(Agency for International Development).

The report is a synthesis of ideas on guidelines and criteria developed from team surveys of community water supply programs in twelve developing countries, four of them in Asia and eight in Latin America. The purpose was to examine AID operations in this field and identify those factors contributing to the development of successful projects as well as those hindering such development. Chapters are devoted to policies, laws and institutions, program planning, capital financing, manpower and training, technical standards, project development, contracts and construction, operation and maintenance, water utility management and developing public support. (Author)

**PB-189 258** HC A05 MF A01  
Federal Housing Administration, Washington, D.C.  
**Minimum Design Standards for Community Water Supply Systems.**  
Jul 65, 76p Rept no. FHA-751

Descriptors: \*Housing, Water supplies, \*Water supplies, Standards, Storage, Distribution, Chemical analysis, Purification, Iron, Manganese, Corrosion inhibition.  
Identifiers: Water resources, \*Water treatment, \*Water softening.

The purpose of the study was to set forth minimum design standards acceptable to FHA for water supply production, treatment, pumping, storage, and distribution facilities to serve properties offered as security for mortgage insurance. These minimum design standards apply to central water systems serving residential neighborhood developments and multifamily projects. (Author)

**PB-189 260** HC A05 MF A01  
International Cooperation Administration, Kingston (Jamaica). Operations Mission.  
**Report of Housing Team of the International Cooperation Administration to the United States Operations Mission, Jamaica.**  
Charles Abrams, James G. Banks, J. Robert Dodge, Marvin S. Gilman, and Kalervo Oberg.  
Apr 61, 87p

Descriptors: \*Urban planning, \*Jamaica, Population, Economics, Sociometrics, Problem solving, Housing, Budgets, Organizations.  
Identifiers: Squatter communities, \*Kingston(Jamaica).

The report includes a description of population, economic and social conditions, tax structure, housing programs, and institutions concerned with construction financing. Urban development in the Kingston area is discussed. Recommendations for improving housing, industrial settlement, and strengthening financing methods are made. (Author)

**PB-189 625** HC A03 MF A01  
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.  
**Housing in Ghana.**  
Country report series.  
1964, 28p  
Sponsored by the Agency for International Development, Washington, D.C.

Descriptors: \*Housing, \*Ghana, Urban planning, Construction, Wages, Population, Economics, Labor, Statistical data, Rural areas, Foreign aid.  
Identifiers: Developing countries.

The report on housing in Ghana is one of a series of reports on housing and related subjects in developing countries. They are also intended to provide basic information to consultants scheduled to undertake overseas assignments as well as to American businessmen interested in foreign investment. (AID abstract)

**PB-189 626** HC A02 MF A01  
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.  
**Housing in India.**  
Country report series.  
1964, 25p  
Sponsored by the Agency for International Development, Washington, D.C.



# APPROPRIATE TECHNOLOGY ABSTRACTS

Descriptors: \*Housing, \*India, Urban planning, Law, Population, Economics, Construction, Labor, Rural areas, Government(Foreign), Statistical data, Research program administration, Foreign aid.  
Identifiers: Developing countries, Slum clearance.

The report on housing in India is one of a series of reports on housing and related subjects in developing countries. They are also intended to provide basic information to consultants schedules to undertake overseas assignments as well as to American businessmen interested in foreign investment. (AID abstract)

**PB-189 627** HC A02 MF A01  
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.  
**Housing in Jordan.**  
Country report series.  
1965, 21p  
Sponsored in part by the Agency for International Development, Washington, D.C.

Descriptors: \*Housing, \*Jordan, Urban planning, Statistical data, Population, Wages, Construction, Sanitary engineering, Labor, Industrial plants.  
Identifiers: Developing countries, Construction loans.

The report on housing in Jordan is one of a series of reports on housing and related subjects in developing countries. They are also intended to provide basic information to consultants scheduled to undertake overseas assignments as well as to American businessmen interested in foreign investment. (AID abstract)

**PB-189 628** HC A05 MF A01  
Agency for International Development, Washington, D.C.  
**Housing and Urban Development Programs: Latin American Bureau.**  
Harold Robinson. 1 Oct 67, 91p

Descriptors: \*Housing, \*Latin America, Urban planning, Rural areas, Economics, Banking, Foreign aid, Construction, Statistical data, Law, Organizations, Wages.  
Identifiers: Low income housing, Investments, Construction loans, Urbanization.

A summary at the beginning of the report includes sections titled: Background, accomplishments and tasks ahead. Other sections provide information on U.S. Congressional action, A.I.D. policy and suggested policy, and descriptions of regional and country programs including objectives, funding and progress. (AID abstract)

**PB-189 813** HC A05 MF A01  
Wisconsin Univ., Madison. Land Tenure Center.  
**Agricultural Cooperatives and Quasi-Cooperatives in Ghana, 1951-1965.**  
Marvin P. Miracle, and Ann Seidman. Jul 68, 79p  
Rept no. LTC-51  
Sponsored in part by Agency for International Development, Washington, D.C.

Descriptors: \*Agriculture, \*Ghana, \*Economics, Agriculture, History, Organizations, Costs, Money, Labor, Commerce.  
Identifiers: \*Agriculture economics, Farm cooperatives, Land titles.

The report traces the history of cooperatives in Ghana from 1928 to 1965, bases on government records. From the beginning the movement has suffered from government domination, inept management and instability. Single or multi-purpose cooperatives have engaged in a wide range of economic activities: buying, selling, credit, subsidies, savings, research, extension and farming. Major successes appear to be in the marketing of export crops. Farmers seem eager enough to join cooperatives but sustained benefits from membership are not recorded. (AID abstract)

**PB-189 816** HC A03 MF A01  
Wisconsin Univ., Madison. Land Tenure Center.

**An Experimental Cooperative Farming Plan in Chile.**  
William C. Thiesenhusen. Oct 65, 43p Rept no. LTC-8  
Sponsored in part by Agency for International Development, Washington, D.C.

Descriptors: \*Agriculture, \*Chile, Management planning, Production, Organizations, Wages, Law.  
Identifiers: \*Cooperative farming, Land reform.

The report describes the organization and first-year operations of a small cooperative farm created by the Catholic Church. The 16 farm families are under administrative guidance of a hired administrator. Credit and technical assistance are furnished by INPROA, the church's agency to administer land reform on church properties. Data on farm income and expenses indicate that families earned more during the first year of the cooperative than in previous years. They did not earn enough to make payments on land purchased. If management of the cooperative can be improved, the cooperative probably can become free of debt. However, trained or experienced managers are scarce. (Author)

**PB-189 818** HC A02 MF A01  
Wisconsin Univ., Madison. Land Tenure Center.  
**Farm Ownership, Political Participation, and Other Social Participation in Central Brazil.**  
J. C. Van Es, and Robert L. Whittenbarger. Jul 68, 22p Rept no. LTC-50  
Sponsored in part by Agency for International Development, Washington, D.C.

Descriptors: \*Agriculture, \*Brazil, \*Economics, Agriculture, Political science, Sociology, Organizations, Rural areas.  
Identifiers: Land titles, Social reforms, \*Agriculture economics.

A test was made of the sociological thesis that land ownership is the basis of social class distinctions, and, more importantly, wide differences in economic and political power. From 255 to 289 farmers were studied. The findings indicate that the present structure of the rural sector does not provide the non-owners with an opportunity to effectively manage their own interests in the larger society. The virtual exclusion, purposive or not, of non-owners from social and political participation creates an environment in which they depend on more privileged community members to serve as brokers in their relations with the rests of the system. (AID abstract)

**PB-189 819** HC A03 MF A01  
Wisconsin Univ., Madison. Land Tenure Center.  
**The Influence of Land Tenure Institutions on the Economic Development of Agriculture in Less Developed Countries.**  
Peter Dörner. Oct 68, 35p Rept no. LTC-55  
Sponsored in part by Agency for International Development, Washington, D.C.

Descriptors: \*Agriculture, \*Latin America, \*Economics, Agriculture, Wages, Population, Control systems, Management planning, Money, Public relations.  
Identifiers: \*Land tenure, Developing countries, Rural to urban migration, Investments.

The document discusses the influence of land tenure systems upon income distribution and demand consequences, economic and political power distribution, investments in agriculture and supply consequences, investments in other sectors of the economy, and premature farm to city migrations. The existing relationships resulting from semi-feudal tenure systems are discussed. (AID abstract)

**PB-189 820** HC A02 MF A01  
Wisconsin Univ., Madison. Land Tenure Center.  
**Frei Unveils New Agrarian Reform Bill.**  
Marion R. Brown. Dec 65, 19p Rept no. LTC-11  
Sponsored in part by Agency for International Development, Washington, D.C.

Descriptors: \*Agriculture, \*Chile, \*Law, Agriculture, Management planning, Public relations, Population, Control systems, Rural areas, Economics.

Identifiers: \*Land reform, Frei Eduardo.

The document describes features of the agrarian reform bill proposed to the Chilean Senate. Land-owners can retain 80 hectares of land, and up to 320 hectares under certain conditions. Expropriated lands are paid for at tax assessed value. Also, compensation for improvements will be made. Each annual payment will be readjusted to 70 percent of the rise of the cost of living and will include interest at 3 percent. The purchaser must live on the farm, keep up his payments, and join a cooperative. He cannot sell, divide, or give away his land without permission from CORA. The state can hold title to the land no longer than three years. Water rights are to be defined and administered under the proposed Bill. (AID abstract)

**PB-189 831** HC A02 MF A01  
Wisconsin Univ., Madison. Land Tenure Center.  
**Fitting Agricultural Extension to the Development Needs of Colombia.**  
Herman Felstehausen. Nov 68, 21p Rept no. LTC-57  
Sponsored in part by Agency for International Development, Washington, D.C.

Descriptors: \*Agriculture, \*Colombia, \*Government(Foreign), Management planning, Organizations, Production control, Models(Simulations), Reviews, Inequalities, Economics.  
Identifiers: Agricultural extension services, Developing countries.

The document analyzes the agricultural extension services in Colombia. The three largest organizations in this field employ 1400 full-time workers. These workers do not reach small farmers with less than 5 hectares.

**PB-189 917** HC A03 MF A01  
Wisconsin Univ., Madison. Land Tenure Center.  
**Agrarian Reform in the Dominican Republic: The Views of Four Consultants.**  
Peter Dörner, C. W. Loomer, Raymond Penn, and Joseph Thome. Dec 67, 48p Rept no. LTC-42  
Sponsored in part by Agency for International Development, Washington, D.C.

Descriptors: \*Economics, \*Dominican Republic, Population, Government(Foreign), Distribution(Economics), Rural areas, Agriculture, Law, Reviews.  
Identifiers: Land repossession, Land reform, Credit, State owned lands.

The document contains three papers on what should be done about distribution of state-owned and repossessed (from Trujillo) lands. Since 60 to 70 percent of the population were in agriculture and from 25 to 30 percent of the people were unemployed, the distribution of lands and titles free to 20,000 farm families seemed reasonable. One percent of all existing farms contained 54 percent of all land in farms, while 50 percent of all farms were smaller than 2.5 acres each. The government could distribute nearly one million acres to as many as 48,000 families. (AID abstract)

**PB-189 919T** HC A02 MF A01  
Wisconsin Univ., Madison. Land Tenure Center.  
**Integrating the Rural Market into the National Economy of Mexico.**  
Delbert T. Myren. Jun 68, 13p Rept no. LTC-46  
Trans. of Comercio Exterior (Mexico) v17 n9 p706ff Sep 67. Presented at the Primer Congreso Nacional de Mercadotecnia, 21-23 Jul 1966, Cuernavaca, Morelos, Mexico.

Descriptors: \*Economics, \*Mexico, \*Rural areas, Commerce, Population, Sociometrics, Agriculture, Fertilizers, Money, Management planning, Reviews.  
Identifiers: Translations.

The document has classified Mexico's agriculture into three sectors: A modern, commercial farming sector which consists of 20 percent of the farm families, a growing transitional sector which includes a rough 45 percent of the farm families, and the traditional or subsistence sector - 35 percent of



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the farm families. No mass market for consumer goods will come into being, the author says, until 80 percent of the farmers sharply increase their purchasing power.

**PB-189 920T** HC A02 MF A01  
Wisconsin Univ., Madison. Land Tenure Center.  
**Agrarian Reform, Land Purchase and Industrialization in Peru.**  
John Strasma. 1969, 22p Rept no. LTC-1  
Trans. of Trimestre Economico (Mexico) v32(3)  
n127 p484-500 Jul/Sep 65.

Descriptors: \*Economics, \*Peru, \*Terrain, Management planning, Law, Government(Foreign), Industries, Money, Rural areas, Sociometrics, Reviews.  
Identifiers: \*Land reform, Translations, Land expropriation, Financing, Land owners.

The paper discusses a proposal for financing agrarian reform and stimulating industrialization in Peru. It is pointed out that the landowners would receive generous compensation for their lands in the form of marketable inflation-proof securities, with support or guarantees by international organizations or foreign governments.

**PB-189 925** HC A09 MF A01  
International Cooperation Administration, Washington, D.C.  
**Latin American Usoms Seminar on Agrarian Reform, Santiago, Chile, Feb. 21 - 24, 1961.**  
1961, 193p  
PORTIONS OF THIS DOCUMENT ARE NOT FULLY LEGIBLE.

Descriptors: \*Agriculture, \*Latin America, \*Terrain, Management planning, Symposia, Economics, Organizations, Problem solving, Standards, Employment, Sociometrics, Law.  
Identifiers: \*Land reform, Land ownership, Economic development, Farm size, Squatter farmers.

The purpose of the seminar was to discuss land reform policies and programs and their place in the economic development of Latin American countries; to make an appraisal of existing physical, human and institutional resources for carrying out such programs; and to determine the nature and amount of external assistance required from various agencies. (AID abstract)

**PB-189 966** HC E99 MF A01  
Wisconsin Univ., Madison. Land Tenure Center.  
**Problems and Conflicts over Land Ownership in Bolivia.**  
Ronald James Clark. Aug 68, 25 Rept no. LTC-49  
Sponsored in part by Agency for International Development, Washington, D.C.

Descriptors: \*Agriculture, \*South America, \*Terrain, Distribution, Money, Law, Rural areas.  
Identifiers: Agricultural development, \*Land tenure, Land use, \*Bolivia.

The report describes two general types of conflict that have resulted from the delay in giving legal land titles to peasants for holdings as specified by the 1952 land reform program. The first kind of conflict arises between displaced landlords and the new owners. The second type results from land grabbing by peasants, competing claims for land owned by deceased peasants, disputes involving common lands, and claims based on supposedly legal titles. Landlords still exploit peasants by loaning them money at high interest rates, and by persuading them to sell the land back to the landlord at low prices. (AID abstract)

**PB-189 969** HC A05 MF A01  
International Cooperation Administration, Manila (Philippines).  
**Land Reform in the Philippines 1950-1958.**  
Rept. for Dec 55-Apr 58  
Frate Bull. 1958, 94p  
PORTIONS OF THIS DOCUMENT ARE NOT FULLY LEGIBLE.

Descriptors: \*Economics, \*Philippines, \*Terrain, Management planning, Agriculture, Law, Population, Federal budgets, Organizations, Money.

Identifiers: \*Land reform, Land tenure, Landlord tenant relationships, Land ownership.

The publication covers two projects on land tenure. It deals with tenancy after World War 2 and with actions to improve the farm tenancy situation, sets up objectives, and describes accomplishments and unsolved land reform problems in 1958.

**PB-189 972** HC A07 MF A01  
Iowa Universities Mission to Peru.  
**Economic Development Through Agrarian Reform in the Central Sierra of Peru.**  
Economic study  
Enrique Vignes-Roig. Jun 67, 150p Rept no. Iowa Peru ES-1  
Prepared in cooperation with Agency for International Development, Lima, Peru.

Descriptors: \*Economics, \*Peru, \*Terrain, Management planning, Problem solving, Agriculture, Mathematical models, Factor analysis, Organizations, Statistical data, Population, Sociometrics.  
Identifiers: \*Land reform, Economic development, Gross national product, Central Sierra region(Peru).

The report analyzes the conditions under which agrarian reform in Peru can be used to promote economic development. It describes problems encountered in the land reform program with respect to land valuation and land expropriation.

**PB-189 973** HC A02 MF A01  
Wisconsin Univ., Madison. Land Tenure Center.  
**The Role of the Ejido in Mexican Land Reform.**  
Discussion paper  
Nathan L. Whetten. May 63, 8p Rept no. DP-3

Descriptors: \*Economics, \*Mexico, \*Terrain, Management planning, Law, Population, Transformations, Control systems, Sociometrics, Rural areas, Agriculture.  
Identifiers: Ejido system, \*Land reform, Collective farms, Socioeconomic status.

The document is concerned with the ejido system in Mexico, one in which the property rights in land are vested in the community. A farmer may be given use of the land for his lifetime, and he might pass it on to an heir but he may not sell it, nor can he rent it. If he does not work it for two years in succession, it will be taken away and assigned to some one else. The author points out the ejido system has served a very valuable purpose but it now needs revision to meet changing social conditions in Mexico.

**PB-189 976** HC A03 MF A01  
Wisconsin Univ., Madison. Land Tenure Center.  
**Freedom and Development. Rural Decision-Making and Agricultural Development.**  
Richard W. Patch. Jul 66, 37p Rept no. LTC-22  
Sponsored in part by Agency for International Development, Washington, D.C.

Descriptors: \*Agriculture, Economics, \*Economics, \*South America, \*Management planning, Agriculture, \*Peru, Agriculture, Rural areas, Decision making, Production, Attitudes, Population.  
Identifiers: Agricultural development, \*Bolivia.

The subsistence farmer has little freedom of choice in his decisions, as he must produce to survive. Freedom to decide, to experiment and to risk is infinitely greater among commercial farmers. Patch contrasts peasants in Cochabamba, Bolivia where land reform transpired with highland peasants of Peru where no reforms had occurred. The Bolivian peasant functions in an environment conducive to development, with considerable freedom of choice. The Peruvian peasant is a near-serf with almost no freedom. The Bolivian peasant has improved his economic, social and political statuses since land reform in 1953. He seeks more products and he buys more goods produced in the city. The highlander is no longer an Indian; he is a person, and with increasing independence. The Peruvian neighbor has experienced no comparable changes. (Author)

**PB-189 984** HC A04 MF A01  
Agency for International Development, Tegucigalpa (Honduras).  
**Honduran Agrarian Reform Law. Report Number 2. Recommendations for Implementation.**  
John C. O'Byrne. 1966, 63p

Descriptors: \*Economics, \*Honduras, \*Law, Terrain, Law, Agriculture, Effectiveness, Reviews, Money.  
Identifiers: Squatter land, \*Land reform, Economic development, Credit, Taxes.

The report is a review of the 1963 Honduran agrarian reform law. The purpose of the study is to determine whether the existing law is workable and meets the needs of the various intended parties or whether the law and amendments are totally usable. The report makes an analysis of the problems and sets forth recommendations which include suggestions to amend the present law to upgrade the agrarian reform agency; assure the companies that the government is deeply concerned with their welfare; and encourage and protect investment in agriculture as a means of promoting social and economic improvement. (AID abstract)

**PB-189 987** HC A03 MF A01  
Iowa Universities Mission to Peru.  
**Economic Development Through Agrarian Reform in Peru. Part I. Nature of and Relationships Between Agrarian Reform and Economic Development. Part II. Analytical Structural Change Model for Analyzing Agrarian Reform Structures and Remedial Alternatives in the Sierra.**  
John F. Timmons, and John C. O'Byrne. 1964, 35p  
Contract ICAC-2226

Descriptors: \*Economics, \*Peru, \*Terrain, Management planning, Agriculture, Problem solving, Population, Sociometrics, Money, Statistical data, Attitudes, Mathematical models, Training.  
Identifiers: \*Land reform, Central Sierra region(Peru), Economic development.

The report sets forth a method for analyzing defects in the agrarian land system and proposes remedial action with special reference to the Sierra. A model is formulated projecting agrarian reform as part of an integrated approach to economic and social development of the national economy. Included are goals and targets for agrarian reform.

**PB-189 988** HC A10 MF A01  
International Cooperation Administration, Manila (Philippines).  
**The Rural Philippines.**  
Generoso F. Rivera, and Robert T. McMillan. Oct 52, 216p

Descriptors: \*Philippines, Economics, Geography, Rural areas, Social sciences, Population, Agriculture.  
Identifiers: Land tenure.

The first part of the book is a pictorial story of rural life in the Philippines. It describes group life, culture, and natural resources of the Philippines. The section on population deals with numbers, distribution, age, sex, race, occupation, fertility, mortality and income. Agriculture in the Philippines is the chief source of livelihood for a large majority of the rural population. The intricate problems associated with Philippine agriculture are largely man-made, namely the smallness of the farms, insecure farm tenancy, shortage of farm credit, a lag in new farming methods, decreasing soil fertility and many others. Major institutions are directly related to the family, to ways of getting and using wealth and to religion, government, education, health, welfare and recreation. (AID abstract)

**PB-189 989** HC A03 MF A01  
Wisconsin Univ., Madison. Land Tenure Center.  
**Rural to Urban Migration: A Colombian Case.**  
Research paper  
William L. Flinn. Jul 66, 45p Rept no. RP-19  
Sponsored in part by Agency for International Development, Washington, D.C.



# APPROPRIATE TECHNOLOGY ABSTRACTS

Descriptors: \*Agriculture, Economics, \*Economics, \*Colombia, Population, Urban areas, Rural areas, Labor, Employment, Sociology, Housing. Identifiers: \*Urban migration.

The report presents the reasons for movement of farmers to urban areas. It discusses how rural to urban migration creates socio-economic development problems in both rural and urban sectors. The slum dwellers in shanty towns around cities believe that their housing, sanitation facilities, income, medical services, and education for children were better in the urban slums than in villages. Very few expressed a desire to return to rural areas. (AID abstract)

**PB-189 991** HC A06 MF A01  
International Cooperation Administration, Manila (Philippines).

**A Special Study of Landed Estates in the Philippines: Analysis and Findings.**  
Arturo P. Sorongon. 22 Aug 55, 124p

Descriptors: \*Economics, \*Philippines, \*Terrain, Distribution, Money, Law, Agriculture, Urban areas, Rural areas, Industries, Questionnaires, Analysis, Statistical data.  
Identifiers: Landed estates, Land assessment, Land use.

The purpose of the report is to develop for the Department of Finance: (1) an analysis of the extent of distribution of large landholdings in the Philippines and (2) necessary statistical information on landed estates. (Author)

**PB-189 992** HC A05 MF A01  
International Development Services, Inc., Washington, D.C.

**Analysis and Recommendations on the Agrarian Reform Program in Ecuador.**  
Keith Himebaugh, Frank V. Beck, and Lisa Lekis. 15 Nov 66, 93p Rept no. P-6628  
Contract AID-518-162

Descriptors: \*Agriculture, Economics, \*Economics, Ecuador, Money, Sociology, Population, Rural areas, Production.  
Identifiers: Agriculture economics, Agrarian reform.

The study gives a report on the financial problems of the Instituto Nacional de Reforma Agraria y Colonizacion (IERAC) which is the Ecuadoran agency for agrarian reform. Only \$21,319,153 equivalent in agrarian reform bonds have been issued since the enactment of the law. As a result of the shortage of bonds, important phases of the program are coming to a halt. Ecuador is reaching the practical limit of its ability to use foreign loans. It discusses other financial problems of IERAC and presents nine recommendations for present and future operation of this organization. (AID abstract)

**PB-189 994** HC A05 MF A01  
International Cooperation Administration, Saigon (Republic of South Vietnam).

**Studies of Land Tenure in Viet Nam (Terminal Report).**  
J. Price Gittinger. Dec 59, 89p

Descriptors: \*Economics, \*Vietnam, \*Terrain, Management planning, Reviews, Leadership, Government(Foreign), Population, Communism, Money, Attitudes, Transformations, Law.  
Identifiers: Land tenure, Collective farms.

The pamphlet is an account of land tenure in Viet Nam over a four-year period ending in 1959. It explains the major agrarian reform policies of the then President of Viet Nam, Ngo Dinh Diem and gives a general description of progress in agrarian reform. Also considered are communal land concepts in recent Vietnamese policy, Communist land policy in North Viet Nam, rent reduction and tenure security in free Viet Nam, the Vietnamese land transfer program, and basic Vietnamese land tenure legislation. (AID abstract)

**PB-189 996** HC A11 MF A01  
Stanford Research Inst., Menlo Park, Calif.  
**Land Reform in Vietnam.**  
Summary rept.

Dec 68, 240p  
Contract AID/VN-8  
See also Volume 1, Part 1, PB-189 997.

Descriptors: \*Economics, \*Vietnam, \*Terrain, Management planning, Law, Attitudes, Population, Government(Foreign), Agriculture, Communism, Economics, Rural areas, Urban areas, Sociometrics.  
Identifiers: Land reform, Land ownership, Viet Cong, Socioeconomic status.

The summary volume is a distillation of the information contained in the other volumes of the report. It is designed to provide the essential factual base on which rational land tenure policies in Viet Nam could be formulated.

**PB-190 000** HC A08 MF A01  
Stanford Research Inst., Menlo Park, Calif.

**Land Reform in Vietnam Working Papers. Volume III. The Viet Cong.**  
Donn E. Seeley, R. Michael Pearce, and Pual S. Taylor. Nov 68, 154p  
Contract AID/VN-8

See also Volume 4 Part 1, PB-190 001, Volume 2, PB-189 999, and PB-189 996. Limited number of copies containing color other than black and white are available until stock is exhausted. Reproductions will be made in black and white only. PORTIONS OF THIS DOCUMENT ARE NOT FULLY LEGIBLE.

Descriptors: \*Economics, \*Vietnam, \*Terrain, Management planning, \*Communism, Impact, Population, Attitudes, Insurgency, Rural areas, Social psychology, Fear, Commerce, Agriculture, Reviews.  
Identifiers: Land reform, Viet Cong, Landlord tenant relationships.

The volume describes the impact of Viet Cong activities on GVN land reform policies and on the rights of the landowners and tenants guaranteed them under the laws of the Republic of Vietnam. Detailed descriptions of Viet Cong land reform policies and practices are presented to provide a basis for assessing the feasibility of land reform measures in an environment of insecurity.

**PB-190 001** HC A09 MF A01  
Stanford Research Inst., Menlo Park, Calif.

**Land Reform in Vietnam Working Papers. Volume IV, Part 1. Surveys and Analyses Related to Land Tenure Issues.**  
Nov 68, 186p  
Contract AID/VN-8  
See also Volume 3, PB-190 000, Volume 4 Part 2, PB-190 002, and PB-189 996.

Descriptors: \*Economics, \*Vietnam, \*Terrain, Management planning, Reviews, Population, Rural areas, Transformations, Sociometrics, Agriculture, Distribution(Economics), Attitudes, Statistical data.  
Identifiers: Land reform, Land tenure, Land expropriation, Landlord tenant relationships, Socioeconomic status.

The document presents the major findings and analysis regarding attitudes and opinions of rural people of all status groups derived from a resident survey and an absentee landlord survey. Factual data on the size, distribution of land, ownership and land use, when combined with the attitudes and opinions recorded, become the basis for a tentative analysis of what direction land distribution policy might have to take to make suitable impacts on the rural population.

**PB-190 131** HC A09 MF A01  
International Cooperation Administration, Manila (Philippines).

**An Economic and Social Survey of Rural Households in Central Luzon.**  
Generoso F. Rivera, and Robert T. McMillan. Jun 54, 197p

Descriptors: \*Philippines, \*Economics, \*Social sciences, Philippines, Agriculture, Employment, Wages, Population.  
Identifiers: Land tenure, Luzon Island.

The report describes the size of farms; landlord-tenant relationships; income; expenses; capital;

credit; employment; wages; and levels of living among 2,500 rural households of nine villages in high tenancy areas of central Luzon. Rapid population growth, an inequitable land tenure system, and lagging farm technology severely hinder agricultural and rural development. (AID abstract)

**PB-190 672** HC A08 MF A01  
Minnesota Univ., Minneapolis. Div. of Environmental Health.

**Small Wells Manual: A Manual of Location, Design, Construction, Use and Maintenance.**  
Ulric P. Gibson, and Rexford D. Singer. Sep 69, 163p  
Sponsored in part by Agency for International Development, Washington, D.C. Office of War on Hunger.

Descriptors: \*Water wells, Construction, Design, Maintenance, Permeability, Rehabilitation, Sanitary engineering, Protection, Site selection, Exploration, Purification, Well logging, Drilling machines, Cutting fluids, Centrifugal pumps, Rotary pumps, Jet pumps, Tables, Diagrams.  
Identifiers: Ground water, \*Water well construction.

The manual covers: (1) origin, occurrence and movement of ground water, (2) ground water exploration, (3) water well design, (4) well construction, disinfection, maintenance and rehabilitation, (5) pumping equipment, and (6) sanitary protection of ground water supplies.

**PB-190 674** HC A05 MF A01  
Public Health Service, Washington, D.C. Office of International Health.

**Community Water Supply in Developing Countries. A Quarter-Century of United States Assistance.**  
Frederick E. McJunkin. 1969, 95p  
Sponsored in part by Agency for International Development, Washington, D.C.

Descriptors: \*Foreign aid, Water supplies, \*Water supplies, Government(Foreign), Southeast Asia, Vietnam, Africa, Latin America.  
Identifiers: Developing nations, South Vietnam.

The report discusses the role of water supply in developing countries; the highlights of AID efforts to improve community water supplies on a worldwide basis with brief reports on typical activities country-by-country, but grouped on a regional basis, i.e. Near East and South Asia, East Asia and Viet-Nam, Africa, and Latin America. (Author)

**PB-190 675** HC A99 MF A01  
Minnesota Univ., Minneapolis. Center for Comparative Political Analysis.

**Bibliography on Planned Social Change (With Special Reference to Rural Development and Educational Development). Volume I. Periodical Literature.**  
Richard Blue, Robert T. Holt, John E. Turner, Richard Erikson, and David Garnham. 1 Jan 67, 693p  
See also Volume 2, PB-190 676.

Descriptors: \*Sociometrics, Transformations, \*Foreign aid, \*Bibliographies, Abstracts, Rural areas, Economics, Agriculture, Education, Political science, Management planning, Attitudes, Africa, Asia, South America, Central America, West Indies, Pacific Ocean Islands, Europe, North America.  
Identifiers: \*Planned social change, Annotated bibliographies, \*Foreign rural development, Developing countries.

The bibliography was prepared primarily to support the major research endeavors of the CIC-AID rural development research project. It is presented in preliminary form primarily for project use. Since a theoretical treatment of economic development in historical context and a specific analysis of a contemporary developing country are both relevant, the bibliography covers a wide range of materials. (Author)

**PB-190 676** HC A10 MF A01  
Minnesota Univ., Minneapolis. Center for Comparative Political Analysis.



# APPROPRIATE TECHNOLOGY ABSTRACTS

## **Bibliography on Planned Social Change (With Special Reference to Rural Development and Educational Development). Volume II. Books and Book Length Monographs.**

Richard Blue, Robert T. Holt, John E. Turner, Richard Erikson, and David Garnham. 1 Jan 67, 214p\*  
See also Volume 1, PB-190 675 and Volume 3, PB-190 677.

Descriptors: \*Sociometrics, Transformations, \*Foreign aid, \*Bibliographies, Political science, Education, Agriculture, Economics, Africa, Asia, Europe, Latin America, Middle East, New Guinea, New Zealand, Management planning.  
Identifiers: Annotated bibliographies, \*Planned social change, Books, \*Foreign rural development, Developing countries.

The document, the second volume in a 3 part report on planned social change in developing countries, contains an annotated bibliography on foreign rural development.

**PB-190 677** HC A09 MF A01  
Minnesota Univ., Minneapolis. Center for Comparative Political Analysis.

## **Bibliography on Planned Social Change (With Special Reference to Rural Development and Educational Development). Volume III. Government Reports, U.N. Reports and Proceedings of Special Conferences.**

Richard Blue, Robert T. Holt, John E. Turner, Richard Erikson, and David Garnham. 1 Jan 67, 196p\*  
See also Volume 1, PB-190 675.

Descriptors: \*Sociometrics, Transformations, \*Foreign aid, \*Bibliographies, Economics, Agriculture, Education, Africa, Asia, Middle East, Latin America, Pacific Ocean Islands, Australia, New Zealand, Europe, North America.  
Identifiers: Annotated bibliographies, \*Planned social change, Foreign rural development, Developing countries.

The document, the third volume of a three part bibliography on planned social change in developing countries, contains government reports, UN reports, and proceedings of conferences on foreign rural development.

**PB-191 034** HC A02 MF A01  
Agency for International Development, Washington, D.C.

## **Urban Development, Including Housing. Bibliography' series.**

1 Apr 70, 25p\* Rept no. Development Administration-7

Descriptors: \*Urban planning, \*Bibliographies, \*Housing, Foreign aid, Northern hemisphere, Southern hemisphere, Government(Foreign), Federal budgets, Reports, Reviews.  
Identifiers: \*Annotated bibliographies, Developing countries.

An annotated bibliography is given, mainly of publications of the U.S. Agency for International Development in the field of urban development, including housing. Many of the publications were developed under contract to AID by the Office of International Affairs, U.S. Development of Housing and Urban Development.

**PB-191 100** HC A05 MF A01  
Library of Congress, Washington, D.C. Special Bibliographies Section.

## **Fish Protein Concentrate. A Comprehensive Bibliography.**

Bruce R. Stillings. 9 Apr 70, 83p

Descriptors: \*Seafood, Proteins, \*Bibliographies, Seafood, Nutrition, Food, Chemical analysis, Processing, Diet, Fishes.

This bibliography has been prepared to provide a comprehensive source of information on efforts directed toward fish protein concentrates mainly for human use. Contents include: General aspects; Processing methods; Chemical composition; Nutritional studies; Acceptability and use in foods.

**PB-191 721** HC A02 MF A01  
Central Piedmont Regional Council of Local Governments, N.C.

## **Citizen Participation.**

Mar 70, 15p\*  
Sponsored in part by Department of Housing and Urban Development.

Descriptors: \*Urban planning, \*North Carolina, \*Public opinion, Decision making, Management planning, Public relations, Organizations, Leadership, Questionnaires, Rural areas.  
Identifiers: Minority groups, \*Citizen planning participation, Central Piedmont region, Low income groups, \*Regional planning, Counties.

The initial citizen participation element provides the means for determining the extent of present citizen participation in local public planning and decision-making throughout the region and for finding ways and means to strengthen and support meaningful citizen involvement from a regional planning point of view. (Author)

**PB-192 726** HC A04 MF A01  
Missouri Univ., Columbia. Dept. of Atmospheric Science.

## **Estimates of Potential Productivity from the Climatology of Solar Energy.**

Final rept.  
1 May 70, 67p  
Grant Cwb-WBG-37

Descriptors: \*Corn, Production, \*Solar radiation, Agriculture, Photosynthesis, Sunspots, Attenuation, Scattering, Absorption, Heat flux, Atmosphere models, Water vapor, Cloud cover, Statistical data.  
Identifiers: Solar flux.

The report deals with climatological evaluation and concerns an experimental study of the energy use by a corn canopy. (Author)

**PB-192 750** HC A04 MF A01  
Pennsylvania State Univ., University Park. Inst. for Research on Land and Water Resources.

## **Simplification of Integrated Stormwater Planning for Modern Multiple Land Use in Urban and Suburban Developments.**

Project technical completion rept.  
Brian M. Reich. 31 Mar 70, 62p\* OWRR-B-010-PA(1)  
Contract DI-14-01-0001-1046

Descriptors: \*Hydrology, Management planning, \*Storms, Drainage, \*Urban areas, Drainage, Urban areas, Rural areas, Terrain, Floods, Control, Mathematical models, Programming(Computers), Storage, Dams, Deterrence, Design.  
Identifiers: \*Synthetic hydrographs, \*Flood routing, Surface water runoff, Watersheds.

Four synthetic hydrograph methods were applied on five watersheds in hopes of simplifying planning decisions for reserved space in valley bottoms of suburbia headwaters. Both hydrograph and routing procedures were programmed for digital computer evaluation for the more than 300 cases considered. General conclusions include the following. (1) No simple rules can be given on width of floodways to planners. Each case must be individually investigated. (2) Computer methods greatly facilitate routing and synthetic hydrograph computations. (3) Generalizations are impossible because interactions occur between the method used, the return period, and the percentage of the watershed above the reservoir among others. (4) A great need exists for data-based methods for predicting suburban design hydrographs in ungaged situations. (5) A new course on urban hydrology was developed from the studies results. The course is designed to teach hydrologists the modern techniques which are being developed to solve this set of urban problems. (WRSIC abstract)

**PB-192 794** HC A03 MF A01  
Road Research Lab., Crowthorne (England).

## **Representative Rural Catchments in Kenya and Uganda.**

D. Fiddes, and J. A. Forsgate. 1970, 35p Rept no. RRL-LR318

Descriptors: \*Drainage, Subsaharan Africa, Rainfall, Networks, Containers, Terrain, Soils, Swamps, Fluid flow, Permeability, Hydraulic models, Floods, Storage, Rural areas, Kenya, Great Britain.  
Identifiers: \*Catchments, Surface water runoff, Culverts, Uganda.

The report describes networks of small rural catchments throughout Kenya and Uganda. The purpose of these is to provide data for the development of a design method for the estimation of waterway sizes for small bridges and culverts. The six catchments in each country are described. They have been sited to provide information on the effect on the runoff hydrograph of the following catchment parameters: (a) area, (b) spatial and temporal rainfall variability, (c) topography and soil type, (d) swamp. For each catchment a rainfall runoff correlation will be prepared, and unit hydrographs isolated. (Author)

**PB-193 242** HC A11 MF A01  
Massachusetts Inst. of Tech., Cambridge. Center for International Studies.

## **The Role of Popular Participation in Development.**

Max F. Millikan, Lucian W. Pye, and David Hapgood. Nov 68, 239p  
Sponsored in part by Agency for International Development, Washington, D.C. Report of a Conference on the Implementation of Title IX of the Foreign Assistance Act, held at the Massachusetts Inst. of Tech., Endicott House, Dedham, Mass., 24 Jun to 2 Aug 68.

Descriptors: \*Sociometrics, Foreign policy, \*Foreign aid, Symposia, Organizations, Decision making, Attitudes, Social psychology, Personnel management, Training, Research program administration, Management planning, Department of Defense, Money.  
Identifiers: \*Economic development, \*Developing countries, Management information systems, International relations.

The report summarizes the discussions, findings and recommendations of a six-week conference on foreign assistance. Half the participants were academic specialists and half were from AID staffs in Washington or in overseas missions. Chapters are devoted to the meaning of foreign assistance, foreign policy implications, AID and non AID instruments for implementing foreign assistance, assessment of programs, and suggested changes in organization, research, recruitment and training. (AID abstract)

**PB-193 553** MF A01  
Economic Development Administration, Washington, D.C.

## **Formula for Growth: How to Make an Industrial Site Survey.**

Oct 69, 30p  
Paper copy available from Superintendent of Documents, GPO, Washington, D.C. 20402. \$0.30 as C48.8:IN2.

Descriptors: \*Industries, \*Site selection, \*Urban areas, Industries, Terrain, Factor analysis, Urban planning, Rural areas, Mapping, Aerial photographs, Roads, Water supplies, Sanitary engineering, Hydrology, Law, Handbooks.  
Identifiers: \*Industrial sites, Economic development, Area planning and development, Zoning, Tax rates.

A firm seeking a location for a new plant needs a site ideal for both present use and future expansion. To back its efforts to attract new industry, a local economic development organization must be fully prepared to supply information on individual plant sites in the area and to point out the unique advantages of each site. The guide explains how to identify sites ideal for industry and how to assemble this information for use in attracting new and expanding companies.

**PB-194 204** HC A05 MF A01  
Agency for International Development, Washington, D.C.



## APPROPRIATE TECHNOLOGY ABSTRACTS

### **Increasing Participation in Development. Primer on Title IX of the United States Foreign Assistance Act.** 27 Sep 70, 78p

Descriptors: \*Foreign aid, \*Developing countries, National government, Economics.  
Identifiers: \*Foreign Assistance Act(Title 9).

Part I of this basic manual reproduces Title IX of the Foreign Assistance Act of 1966. There are excerpts from earlier related legislation on community development and cooperatives, from congressional reports and studies, and comments of congressmen on Title IX. Also included are excerpts from a 1968 statement by the Administrator of AID on progress toward Title IX objectives and from the AID report to the House Committee on Foreign Affairs on Title IX dated May 10, 1967. There is an inventory of AID Title IX activities, and a list of additional statutory authority in AID legislation which supports Title IX objectives. (AID abstract)

**PB-194 368** HC A09 MF A01  
Kansas Dept. of Economic Development.  
**A Design Study on the Economic Use of Agricultural Wastes in Kansas.**  
Kansas planning for development.  
Jan 69, 183p\* Rept no. 25  
Prepared in cooperation with Theracon, Inc., Topeka, Kans. and Kansas Economic Development Commission.

Descriptors: \*Agricultural wastes, Utilization, \*Waste disposal, Effectiveness, \*Economic development, \*Kansas, Management planning, Benefit cost analysis, Research projects, Environmental engineering, Water pollution, Control.

The report represents a study of agricultural wastes in Kansas and the technology available for economic utilization. The principal wastes that may provide raw materials for profitable utilization are identified and data on location and quantity of each waste are presented. The most important agricultural waste in Kansas comes from large cattle feedlots. Since disposal is costly to the cattle feeding industry utilization technology is sought to provide raw material for economic development. (Author)

**PB-194 391** HC A03 MF A01  
Ernst and Ernst, Washington, D.C.  
**Study of Raw Material Costs for a Proposed Straw-Based Pulping Mill in the Vicinity of Mobridge, South Dakota.**  
Aug 70, 36p EDACOMM-70-001  
Contract C-9-35084

Descriptors: \*Pulp mills, \*Cost estimates, \*Economic development, \*South Carolina, Corrugating, Straw, Waste papers, Employment, Pulping, Feasibility.  
Identifiers: Straw based pulping, \*Technical assistance, Mobridge(South Dakota).

The concept of establishing a mill to manufacture corrugating medium on land owned by the Standing Rock Sioux Indian Tribe in the vicinity of Mobridge, South Dakota has been to take advantage of one of the area's abundant and relatively little-used resources, wheat straw, as a principal ingredient. The specific purpose of this study was to: (1) determine the availability of sufficient straw to support the proposed mill; (2) to determine various cost elements attendant to the collection and storage of straw and the availability and procurement costs of the other principal ingredient of the mill's output - waste paper. (Author)

**PB-194 757** HC A06 MF A01  
California State Dept. of Housing and Community Development, Sacramento.  
**Demonstration in Low-Cost Housing Techniques.**  
Final rept.  
Charles R. LeMenager, Ed Bowe, and Dean C. Hill. Jun 70, 110p\*  
Contract HUD-H-650

Descriptors: \*Residential buildings, \*California, \*Rural areas, Residential buildings, Construction management, Cost analysis, Construction materi-

als, Drawings, Evaluation, Factor analysis, Statistical data, Time.  
Identifiers: Low cost housing, Demonstration projects.

The low income housing demonstration project is part of the search for means of developing housing to be utilized for low income domestic and often migratory farm workers in the western states. The objective was to study methods of construction, building materials and supplies, and building plans in three California areas which would produce inexpensive housing. A total of 28 units were built using a variety of construction techniques. Studies of the units and their occupants have been made and the results are recorded. The report reflects building costs and building construction features, as well as the amenities or undesirable features of these structures as seen through the eyes of professional building evaluators, housing authority officials, and the residents themselves. (Author)

**PB-195 052** HC A08 MF A01  
Bureau of Commercial Fisheries, Ann Arbor, Mich.  
**Evaluation of an Experimental Fish Reduction Process Applicable to Small Fisheries.**  
Jul 70, 165p\* EDACOMM-70-012

Descriptors: \*Economic development, Fisheries, \*Fresh water fishes, Processing, Aquatic animals, Pesticides, Removal, Cost analysis, Feeding stuffs, Animal nutrition, Production capacity, Market research.  
Identifiers: \*Mink industry, Fishcare, Pressfish, Technical assistance projects.

The study is concerned with use of freshwater fish for mink food. Feeding trails with presscake are described. Recommendations indicate that presscake offers considerable promise in the mink industry. Additional research is recommended. An implementation program makes technical assistance available to anyone showing interest in production or use of presscake. (BCF abstract).

**PB-195 226** HC A10 MF A01  
Massachusetts Inst. of Tech., Cambridge.  
**The Economics of Fish Protein Concentrate.**  
Sep 70, 202p\* MSC-71-69

Descriptors: \*Fish protein concentrates, \*Economic analysis, \*Developing countries, Fish protein concentrates, Cost estimates, Nutritive value, Food habits, International trade, Chile, Capital, Infant nutrition, Fishing.

The report examines the economic feasibility of fish protein concentrate (FPC) in two contexts: (1) As a nutritional supplement in the diet of a developing country; and (2) as a competitive food additive in the United States. These subjects are examined with special reference to the role that the United States Government should play in the development of FPC. The Report recommends that: Efforts to tie the FPC program to the domestic fisheries should be resisted; a reasoned, broadbased program of research into the basic technology of FPC is one of the better investments that the U.S. could presently make, and that such a program should be supported and strengthened; and the Aberdeen, Washington pilot scale FPC processing plant should be developed into a flexible, pilot scale testing center for a variety of processes and combinations of processes. A bibliography of 113 references is included. (Author)

**PB-195 275** HC A04 MF A01  
Bureau of Reclamation, Denver, Colo. Div. of General Research.  
**Water Measurement Procedures Irrigation Operator's Workshop.**  
J. C. Schuster. Sep 70, 59p Rept no. REC-OCE-70-38

Descriptors: \*Irrigation, Hydraulics, \*Water flow, Measurement, Manuals, Meetings, Instructions, Water meters, Discharge, Orifice meters, Venturi, Weirs, Flow meters, Ultrasonic radiation, Radiation measuring instruments.

Water Measurement Procedures were written primarily as a teaching aid in presenting the fundamentals of water measurement to field personnel

engaged in irrigation work. Technical material has been simplified to provide a clear understanding of water measurement devices and procedures. Basic hydraulics presented include the discharge equation, velocity head concept, orifice and weir relationships, and the effect of submergence. Factors affecting the accuracy of measurement such as work equipment, infrequent head measurement, and use of wrong measuring devices are analyzed. Commonly used devices and methods are discussed, including orifices, weirs, Venturi meters, Parshall and Venturi flumes, meter gates, constant head turnouts, and propeller meters; special devices and methods include vane deflection meters, acoustic and magnetic meters, and the dilution and radioisotope methods of measurement. Hints for troubleshooting poorly operating devices, suggestions to operators on how to do a good job, and a selected reading list for operators are given. (Author)

**PB-195 291** HC A18 MF A01  
Charles River Associates, Inc., Cambridge, Mass.  
**Choice of Transport Technology under Varying Factor Endowments in Less Developed Countries.**  
Final rept. 30 Jan 69-30 Jun 70  
Paul Roberts. Jun 70, 409p\* Rept no. CRA-138-30  
Contract DOT-OS-A9-003  
See also PB-195 292 and PB-195 293.

Descriptors: \*Transportation, \*Developing countries, \*Economic development, Transportation, \*Project planning, Transportation, Economic analysis, Management methods, Highway transportation, Rail transportation, Factor analysis, Substitutes, Benefit cost analysis, Traffic engineering, Transportation models, Air transportation.  
Identifiers: Technology.

The study was undertaken to assist developing countries in making economically rational choices in transport technologies--and thus to assist in their economic development and eventually to reduce the need for external capital assistance. The study uses cost simulation models for road, rail and air transport modes to develop guidelines for planners, taking account of the varying conditions of factor endowments (i.e., availabilities of labor, capital, and other resources) in the developing countries. Investment decisions involving choice of technology and mode may be expected to be sensitive to differences in prices of inputs. The sample problems of the report concern: A comparison of investment in a new rail facility and in a new road to serve a route between two traffic centers (nodes); and an evaluation of the various trade-offs involving vehicle technology and airport investment. (DOT abstract)

**PB-195 315** HC A12 MF A01  
Agency for International Development, Washington, D.C.  
**A.I.D. Spring Review of Land Reform. Volume I. Land Reform in India.**  
Country papers, 2nd ed.  
Gene Wunderlich, Walter C. Neale, F. Tomasson Jannuzzi, and Ronald G. Ridker. Jun 70, 268p\*  
Rept nos. SR/LR/C-20, SR/LR/C-21  
Also includes Rept. no. SR/LR/C-22, SR/LR/B-4.  
See also Volume 2, PB-195 316.

Descriptors: \*Land, \*Government policies, \*Economic development, \*India, Legislation, Land titles, Economic surveys, Demography, Sociometrics, Agriculture, Foreign aid, Revisions, Urbanization.  
Identifiers: Land laws, \*Land reform.

The document on India is one of a series which covers most nations that have experienced or are considering land reform. The design for each paper is the same: the situation before reform, the reform program, and the effects of the program. (AID abstract)

**PB-195 316** HC A12 MF A01  
Agency for International Development, Washington, D.C.



## APPROPRIATE TECHNOLOGY ABSTRACTS

### **A.I.D. Spring Review of Land Reform. Volume II. Land Reform in Iran, Iraq, Pakistan, Turkey, Indonesia.**

Country papers, 2nd ed.  
Kenneth B. Platt, H. Charles Treakle, Charles M. Elkington, Edwin J. Cohn, and E. Utrecht. Jun 70, 273p\* Rept nos. SR/LR/C-18, SR/LR/C-19  
Also includes Rept. no. SR/LR/C-30. See also Volume 3, PB-195 317.

Descriptors: \*Land, \*Middle East, \*Economic development, Asia, \*Iran, \*Economic development, \*Iraq, Economic development, \*Indonesia, Economic development, \*Pakistan, Economic development, \*Turkey, Economic development, Economic surveys, Demography, Sociometrics, Revisions, Legislation, Land titles, Agriculture, Developing countries, Urbanization.  
Identifiers: Land laws, \*Land reform.

The document on Iran, Iraq, Pakistan, Turkey and Indonesia is one of a series covering most nations that have experienced or are considering land reform. The design for each country paper is the same: the situation before reform, the reform program, and the effects of the program. (AID abstract)

### **PB-195 317** HC A14 MF A01 Agency for International Development, Washington, D.C.

### **A.I.D. Spring Review of Land Reform. Volume III. Land Reform in Japan, South Korea, Taiwan.**

Country papers, 2nd ed.  
Harold E. Voelkner, Robert B. Morrow, Kenneth H. Sherper, and Anthony Y. C. Koo. Jun 70, 315p\* Rept nos. SR/LR/C-23, SR/LR/C-24  
Also includes Rept. no. SR/LR/C-25. See also Volume 4, PB-195 318.

Descriptors: \*Land, \*Government policies, \*Economic development, Far East, \*Japan, Economic development, \*South Korea, Economic development, \*Taiwan, Economic development, Legislation, Land titles, Economic surveys, Demography, Sociometrics, Agriculture, Revisions, Foreign aid, Urbanization.  
Identifiers: Land laws, \*Land reform.

The document on Japan, South Korea, and Taiwan is one of a series which covers most nations that have experienced or are considering land reform. The design for each country paper is the same: the situation before reform, the reform program, and the effects of the program. (AID abstract)

### **PB-195 318** HC A14 MF A01 Agency for International Development, Washington, D.C.

### **A.I.D. Spring Review of Land Reform. Volume IV. Land Reform in the Philippines, North Vietnam, South Vietnam.**

Country papers, 2nd ed.  
Harold D. Koone, Lewis E. Gleeck, Christine Pelzer White, and MacDonald Salter. Jun 70, 304p\* Rept nos. SR/LR/C-26, SR/LR/C-27  
Also includes Rept. no. SR/LR/C-28. See also Volume 5, PB-195 319.

Descriptors: \*Land, \*Government policies, \*Economic development, Southeast Asia, \*Philippines, Economic development, \*North Vietnam, Economic development, \*South Vietnam, Economic development, Legislation, Land titles, Economic surveys, Agriculture, Demography, Sociometrics, Revisions, Foreign aid, Urbanization.  
Identifiers: Land laws, \*Land reform.

The document on the Philippines, North Vietnam, and South Vietnam is one of a series covering most nations that have experienced or are considering land reform. The design for each country paper is the same: the situation before reform, the reform program, and the effects of the program. (AID abstract)

### **PB-195 319** HC A11 MF A01 Agency for International Development, Washington, D.C.

### **A.I.D. Spring Review of Land Reform. Volume V. Land Reform in Chile, Colombia, Venezuela.**

Country papers, 2nd ed.

William C. Thiesenhusen, Herman Felstehausen, and Harry E. Wing, Jr. Jun 70, 232p\* Rept nos. SR/LR/C-8, SR/LR/C-31  
Also includes Rept. no. SR/LR/C-4, SR/LR/C-3.  
See also Volume 6, PB-195 320.

Descriptors: \*Land, \*Government policies, \*Economic development, South America, \*Chile, Economic development, \*Colombia, Economic development, \*Venezuela, Economic development, Legislation, Land titles, Economic surveys, Agriculture, Demography, Sociometrics, Revisions, Foreign aid, Urbanization.  
Identifiers: Land laws, \*Land reform.

The document on Chile, Colombia and Venezuela is one of a series which covers most nations that have experienced or are considering land reform. The design for each country paper is the same: the situation before reform, the reform program, and the effects of the program. (AID abstract)

### **PB-195 320** HC A13 MF A01 Agency for International Development, Washington, D.C.

### **A.I.D. Spring Review of Land Reform. Volume VI. Land Reform in Bolivia, Ecuador, Peru.**

Country papers, 2nd ed.  
Ronald James Clark, and Thomas F. Carroll. Jun 70, 280p\* Rept nos. SR/LR/C-7, SR/LR/C-5  
Also includes Rept. no. SR/LR/C-6. See also Volume 7, PB-195 321.

Descriptors: \*Land, \*Government policies, \*Economic development, South America, \*Bolivia, Economic development, \*Ecuador, Economic development, \*Peru, Economic development, Legislation, Land titles, Economic surveys, Agriculture, Demography, Sociometrics, Revisions, Foreign aid, Urbanization.  
Identifiers: Land laws, \*Land reform.

The document on Bolivia, Ecuador, and Peru is one of a series which covers most nations that have experienced or are considering land reform. The design for each country paper is the same: the situation before reform, the reform program, and the effects of the program. (AID abstract)

### **PB-195 321** HC A13 MF A01 Agency for International Development, Washington, D.C.

### **A.I.D. Spring Review of Land Reform. Volume VII. Land Reform in Brazil, Northeast Cuba, Guatemala, Mexico.**

Country papers, 2nd ed.  
Antonio Gayoso, and Folke Dovring. Jun 70, 296p\* Rept nos. SR/LR/C-9, SR/LR/C-29  
Also includes Rept. nos. SR/LR/C-2, SR/LR/C-1.  
See also Volume 8, PB-195 322.

Descriptors: \*Land, \*Government policies, \*Economic development, Latin America, \*Brazil, Economic development, \*Cuba, Economic development, \*Guatemala, Economic development, \*Mexico, Economic development, Economic surveys, Agriculture, Demography, Sociometrics, Legislation, Foreign aid, Land titles, Urbanization.  
Identifiers: Land laws, \*Land reform.

The document on Northeast Brazil, Mexico, Cuba, and Guatemala is one of a series which covers most nations that have experienced or are considering land reform. The design for each country paper is the same: the situation before reform, the reform program, and the effects of the program. (AID abstract)

### **PB-195 322** HC A13 MF A01 Agency for International Development, Washington, D.C.

### **A.I.D. Spring Review of Land Reform. Volume VIII. Land Reform in Algeria, Tunisia, the United Arab Republic.**

Country papers, 2nd ed.  
Phillips W. Foster, John L. Simmons, and Kenneth B. Platt. Jun 70, 278p\* Rept nos. SR/LR/C-13, SR/LR/C-14  
Also includes Rept. no. SR/LR/C-17. See also Volume 9, PB-195 323.

Descriptors: \*Land, Government policies, \*Economic development, North Africa, \*Algeria, Eco-

conomic development, \*Tunisia, Economic development, \*United Arab Republic, Economic development, Legislation, Land titles, Economic surveys, Agriculture, Urbanization, Demography, Sociometrics, Revisions, Foreign aid.  
Identifiers: Land laws, \*Land reform.

The document on Algeria, Tunisia, and the UAR is one of a series which covers most nations that have experienced or are considering land reform. The design for each country paper is the same: the situation before reform, the reform program, and the effects of the program. (AID abstract)

### **PB-195 323** HC A07 MF A01 Agency for International Development, Washington, D.C.

### **A.I.D. Spring Review of Land Reform. Volume IX. Land Reform in Kenya. The Land Tenure Problem in Nigeria.**

Country papers, 2nd ed.  
Barbara K. Herz, and Kenneth H. Parsons. Jun 70, 135p\* Rept nos. SR/LR/C-16, SR/LR/C-15  
See also Volume 10, PB-195 324.

Descriptors: \*Land, Government policies, \*Economic development, Sub-Saharan Africa, \*Kenya, Economic development, \*Nigeria, Economic development, Legislation, Land titles, Economic surveys, Agriculture, Urbanization, Sociometrics, Revisions, Foreign aid.  
Identifiers: Land laws, \*Land reform.

The document on Kenya and Nigeria is one of a series which covers most nations that have experienced or are considering land reform. The design for each country paper is the same: the situation before reform, the reform program, and the effects of the program. (AID abstract)

### **PB-195 324** HC A12 MF A01 Agency for International Development, Washington, D.C.

### **A.I.D. Spring Review of Land Reform. Volume X. Land Reform in Hungary, Italy, Yugoslavia. Regional Surveys.**

Country papers, 2nd ed.  
Folke Dovring, Davis McEntire, and Edward B. Rice. Jun 70, 256p\* Rept nos. SR/LR/C-10, SR/LR/C-12  
Also includes Rept. nos. SR/LR/C-11, SR/LR/C-32. See also Volume 11, PB-195 325.

Descriptors: \*Land, Government policies, \*Economic development, Europe, \*Hungary, Economic development, \*Italy, Economic development, \*Yugoslavia, Economic development, Revisions, Developing countries, Legislation, Land titles, Urbanization, Sociometrics, Foreign aid.  
Identifiers: Land laws, \*Land reform.

The document on Hungary, Italy and Yugoslavia, regional surveys is one of a series covering most nations that have experienced or are considering land reform. The design for each country paper is the same: the situation before reform, the reform program, and the effects of the program. (AID abstract)

### **PB-195 325** HC A16 MF A01 Agency for International Development, Washington, D.C.

### **A.I.D. Spring Review of Land Reform. Volume xi. Analytical Papers.**

Country papers, 2nd ed.  
Jun 70, 372p\* Rept no. SR/LR/A-1  
Also includes Rept. nos. SR/LR/A-2,3,4,5,6,7,8,9,10,11,12. See also Volume 12, PB-195 326.

Descriptors: \*Land, Government policies, \*Foreign government, Management planning, \*Surveys, Developing countries, Agricultural economics, Political science, Land surveys, Financing, Credit, Residential buildings, Demography, Farm management, Urbanization, Europe.  
Identifiers: Land laws, \*Land reform.

The document is one of a series which covers most nations that have experienced or are considering land reform in Hungary, Italy and Yugoslavia. The design for each country paper is the same: the situation before reform, the reform program, and



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the effects of the program. The country papers are the basic source of information for the Analytical Papers. (AID abstract)

**PB-195 326** HC A10 MF A01  
Agency for International Development, Washington, D.C.  
**A.I.D. Spring Review of Land Reform. Volume XII. Background Papers.**  
Country papers, 2nd ed.  
Jun 70, 220p\* Rept no. SR/LR/B-1  
Also includes Rept. nos. SR/LR/B-2,3,4,5,6,7.  
See also Volume 1, PB-195 315.

Descriptors: \*Land, Developing countries, \*Foreign government, Management planning, \*Economic development, Technical reports, Foreign aid, Opinions, Economic surveys, Rural areas, Agriculture, Theories, Mathematical models, Latin America, India, Asia, Europe, Africa.  
Identifiers: Poverty, Land laws, \*Land reform.

The document is one of a series which covers most nations in Latin America, Asia, Europe, and Africa that have experienced or are considering land reform. The design for each country paper is the same: the situation before reform, the reform program, and the effects of the program. The volume contains background studies. (AID abstract)

**PB-195 597** PC A10 MF A01  
California Univ., Berkeley. Inst. of Transportation and Traffic Engineering.  
**Opportunities for Cost Reduction in the Design of Transport Facilities for Developing Regions. Volume I.**  
Mar 70, 220p  
Contract DOT-OS-A9-004  
See also Volume 2, PB-195 598.

Descriptors: \*Transportation, \*Developing countries, \*Highways, Cost engineering, Design standards, Economic analysis, Construction, Mathematical models, Savings, Highway bridges, Culverts, Ferryboats, Foreign aid.  
Identifiers: Fords(Water crossings).

The study explores the problem of the selection of low-cost technologies for provision of transportation in developing countries. It surveys the range of technologies that might be used, investigates analytical approaches, and suggests bases for selecting among resource and cost alternatives. Volume I discusses at length various problems relating to technologic choice in the field of road transport. Among the problems treated are the development of cost functions, design standards, pavement type, water crossings, one-lane bridging, and vehicle types. Statistical tables graphics, and lists of references appear at the end of the chapter when appropriate. (Author)

**PB-195 598** PC A10 MF A01  
California Univ., Berkeley. Inst. of Transportation and Traffic Engineering.  
**Opportunities for Cost Reduction in the Design of Transport Facilities for Developing Regions. Volume 2.**  
Mar 70, 221p\*  
Contract DOT-OS-A9-004  
See also Volume 1, PB-195 597.

Descriptors: \*Transportation, \*Developing countries, \*Cost engineering, Transportation, Cost control, Foreign aid, Air transportation, Waterway transportation, Ground vehicles, Investments, Economic models.  
Identifiers: \*Transport technology, Investment models.

The study explores the problem of the selection of low-cost technologies for provision of transportation in developing countries. It surveys the range of technologies that might be used, investigates analytical approaches, and suggests bases for selecting among resource and cost alternatives. The chapters comprising the second of two volumes discuss potential cost savings in the design and use of ground vehicles; reduction of cost in aircraft, airports and airways; savings in the selection of waterway and harbor techniques; and economic

models for the choice of levels of transport investment. (Author)

**PB-195 757** PC A04 MF A01  
Tri-County Regional Planning Commission, Lansing, Mich.  
**Comprehensive Development Plan, Bath Charter Township.**  
Apr 70, 64p

Descriptors: \*Urban planning, \*Michigan, Land use, Education, Recreational facilities, Public buildings, Public utilities, Roads.  
Identifiers: \*Bath Charter Township(Michigan), Shopping centers.

The report contains an analysis of Bath Charter Township in terms of historical growth trends, existing situation, and projected needs. Specifically the report contains six major sections. The first of these is the Planning Perspective which denotes goals and policies as well as the Township's existing situation. Assumptions and projections are included in the second section termed Dimensions of Future Change. The third section portrays the Land Use Plan while the fourth and fifth sections assess the future needs for community facilities, utilities and streets, and provides necessary policies to guide their development. Implementation procedures such as zoning and capital improvement programs are discussed in the sixth section of the report. Projections and policies are made for the year 1990. (Author)

**PB-195 900** PC A02 MF A01  
Alabama Agricultural Experiment Station, Auburn.  
**Report of Fishcultural Investigations in the Federation of Malaysia. Increasing Fish Production by Improved Fishcultures, Phase I.**  
H. S. Swingle, and D. D. Moss. 15 Aug 69, 18p  
Contract AID/csd-1581  
Revision of report dated 26 Feb 68.

Descriptors: \*Aquaculture, \*Malaysia, \*Fisheries, Surveys, Fresh water fishes, Research, Personnel, Laboratories.  
Identifiers: Tropical fish culture.

The report surveys the Fisheries Department of the Ministry of Agriculture which operates three marine stations and seven freshwater fish hatcheries. It covers the physical plant, water supply, facilities, staff and major research projects of the Tropical Fish Culture Research Station at Malacca, which is not part of the Fisheries Department. It discusses the problems involved in the future operation of the research station. (Author)

**PB-195 901** PC A02 MF A01  
Alabama Agricultural Experiment Station, Auburn.  
**Report of Fishcultural Investigations in East Pakistan. Increasing Fish Production by Improved Fishcultures.**  
H. S. Swingle, and D. D. Moss. 15 Aug 69, 17p  
Contract AID/csd-1581  
Revision of report dated 30 Jan 68.

Descriptors: \*Aquaculture, \*Pakistan, \*Fisheries, Surveys, Fresh water fishes, Production, Education, Universities, Research.

The report discusses the need for increased fish production as a means of increasing the supply of protein. It surveys the freshwater fisheries station at Chandpur and the features contributing to its unsuitability as a main research station. Covers the School of Fisheries at the East Pakistan Agricultural University at Mymensingh and the advantages and disadvantages of establishing a freshwater fisheries research station at the university. Information is included on the possible establishment of a brackishwater station and a Fisheries Development Corporation. Preliminary recommendations are given for a fishculture project in East Pakistan. (AID abstract)

**PB-195 902** PC A02 MF A01  
Alabama Agricultural Experiment Station, Auburn.  
**Report of Fishcultural Investigations in Japan. Increasing Fish Production by Improved Fishcultures, Phase I.**  
H. S. Swingle, and D. D. Moss. 15 Aug 69, 25p

Contract AID/csd-1581  
Revision of report dated 15 Apr 68.

Descriptors: \*Aquaculture, \*Japan, \*Fisheries, Surveys, Carp, Freshwater fishes, Research, Laboratories, History.

The report surveys several fisheries stations and farms primarily involved in carp culture in ponds and ricefields. Summary sheets are attached on carp culture in paddy fields in Nagano Prefecture. Also given are an outline and short history of the Freshwater Fisheries Research Laboratory and includes the organizational structure, facilities and principal research projects. (AID abstract)

**PB-195 903** PC A02 MF A01  
Alabama Agricultural Experiment Station, Auburn.  
**Report of Fishcultural Investigations in South Vietnam. Increasing Fish Production by Improved Fishcultures.**  
H. S. Swingle, and D. D. Moss. 15 Aug 69, 20p  
Contract AID/csd-1581  
Revision of report dated 15 Feb 68.

Descriptors: \*Aquaculture, \*South Vietnam, \*Fisheries, Surveys, Fresh water fishes, Proteins, Production, Lakes, Ponds, Education, Research.

The report contains general information on the present fish catch and suggests a means of increasing the availability of high quality protein in inland areas by increasing fish production in existing ponds and lakes. It includes data on the South Vietnam Directorate of Fisheries and the 14 inland and three brackishwater stations and describes the Revolutionary Development Training Center and its fisheries training ponds. Recommendations are made for a research and training program. (Author)

**PB-195 904** PC A03 MF A01  
Alabama Agricultural Experiment Station, Auburn.  
**Report of Fishcultural Investigations in Taiwan. Increasing Fish Production by Improved Fishcultures.**  
H. S. Swingle, and D. D. Moss. 15 Aug 69, 27p  
Contract AID/csd-1581  
Revision of report dated 17 Jun 69.

Descriptors: \*Aquaculture, \*Taiwan, \*Fisheries, Surveys, Fishing grounds, Education, Universities, Mushrooms, Production.

The report discusses the importance of fisheries to Taiwan and the production from fish cultures. It gives data on fish farms, research stations, culture stations, and includes information on research experiments, training and facilities. It also covers the Taiwan chlorella Factory, mushroom culture, and fishery training at Taiwan National University. (AID abstract)

**PB-195 905** PC A03 MF A01  
Alabama Agricultural Experiment Station, Auburn.  
**Report of Fishcultural Investigations in Thailand. Increasing Fish Production by Improved Fishcultures, Phase I.**  
H. S. Swingle, and D. D. Moss. 15 Aug 69, 38p  
Contract AID/csd-1581  
Revision of report dated 15 Jan 68.

Descriptors: \*Aquaculture, \*Thailand, \*Fisheries, Surveys, Fresh water fishes, Production, Inland waterways, Soils, Rainfall, Evapotranspiration, Research, Universities.

The report presents areas from which freshwater fish are available and on changes to future inland fish production because of the rapid increase in reservoir construction. It discusses the Northeast area giving data on soils, rainfall, evapotranspiration and fisheries stations, and analyzes the work of the Department of Fisheries and lists their freshwater and brackishwater fisheries stations. Data are included on the main station at Bangkok, the College of Fisheries at Kasetsart University and the Khon Kaen Agricultural Research Center. Recommendations are made for a fishculture project in Thailand. (AID abstract)

**PB-195 906** PC A03 MF A01  
Alabama Agricultural Experiment Station, Auburn.



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### **Report of Fishcultural Investigations in India. Increasing Fish Production by Improved Fishcultures, Phase I.**

H. S. Swingle, and D. D. Moss. 15 Aug 69, 27p  
Contract AID/csd-1581  
Revision of report dated 16 Feb 68.

Descriptors: \*Aquaculture, \*India, \*Fisheries, Surveys, Education, Research, Universities, Fishes, Production.

The report gives background information on fisheries in India. It surveys the Central Fisheries Station, a research substation and a brackishwater station. Data are included on fisheries education and state fisheries. It recommends a new location for a large freshwater fishcultural research station, establishment of several fishcultural substations, a survey to determine the desirability of a large brackish-seawater fishcultural research station, and one or more universities setting up a formal fisheries training program. (Author)

### **PB-195 907 PC A04 MF A01 Alabama Agricultural Experiment Station, Auburn. Fishculture Survey Report for Ecuador. Increasing Fish Production by Improved Fishcultures.**

H. S. Swingle, and F. A. Pagan. 20 Dec 69, 51p  
Contract AID/csd-2270

Descriptors: \*Aquaculture, \*Ecuador, \*Fisheries, Surveys, Education, Nutrition, Geography, Management planning, Inland waterways, Coasts, Seafood, Food processing.

The report surveys the fisheries in the provinces of Pichincha, Manabi, De Los Rios and Del Guayas. It includes data on nutritional requirements, geography, status of fisheries, fisheries management, training and seafood processing plants. Reviews the inland fisheries and coastal aquaculture. Numerous recommendations are made for the improvement of the fishculture in the country. Discusses the FAO fisheries project to begin in January 1970. (AID abstract)

### **PB-195 908 PC A04 MF A01 Alabama Agricultural Experiment Station, Auburn. Fishculture Survey Report of Colombia. Increasing Fish Production by Improved Fishcultures.**

H. S. Swingle, and F. A. Pagan. 1 Sep 70, 69p  
Contract AID/csd-2270  
Revision of report dated 10 Jan 70.

Descriptors: \*Aquaculture, \*Colombia, \*Fisheries, Surveys, Fishing grounds, Management planning, Nutrition, Production, Fresh water fishes, Education, Statistical analysis.

The report contains material on the status of nutrition, fisheries statistics, fisheries management agencies, the FAO fisheries program, universities involved in fisheries research and training, freshwater fisheries and marine fisheries. Recommends several programs to improve production, exploitation and management of fishculture in Colombia. (Author)

### **PB-195 909 PC A04 MF A01 Alabama Agricultural Experiment Station, Auburn. Report of Fishcultural Investigations in the Philippines. Increasing Fish Production by Improved Fishcultures.**

H. S. Swingle, and D. D. Moss. 15 Aug 69, 62p  
Contract AID/csd-1581  
Revision of report dated 10 Oct 67.

Descriptors: \*Aquaculture, \*Philippines, \*Fisheries, Surveys, Fishing grounds, Education, Statistical analysis, Fresh water fishes, Production, Cost analysis.

Describes the overall fisheries situation in the country. Reviews a proposed cooperative fishery project to establish both an adequate brackishwater and a freshwater fishcultural research station. Discusses best location and site for each station, and the agencies and institutions who will cooperate in the use of the stations. Descriptive data is given on the proposed freshwater pondculture station at Mindanao State University including capital and

operating costs. Similar materials are given for the proposed brackishwater pondculture stations at Leganes on Panay Island. (Author)

### **PB-195 910 PC A03 MF A01 Alabama Agricultural Experiment Station, Auburn. Fishculture Survey Report for Paraguay.**

R. O. Smitherman, and D. D. Moss. 20 Sep 70, 44p

Contract AID/csd-2270

Descriptors: \*Aquaculture, \*Paraguay, \*Fisheries, Surveys, Geography, Economic conditions, Water resources, Education, Recreation, Lakes, Rivers, Ponds, Reservoirs.

The report reviews the geography, and the nutritional and economic aspects of the country. Discusses the water resources and the status of fisheries. It includes data on fisheries training and the agencies responsible for fisheries, and examines sport fishery and its potential for increasing tourism. It makes recommendations for advisory and training assistance. (AID abstract)

### **PB-195 912 PC A04 MF A01 Alabama Agricultural Experiment Station, Auburn. Fishculture Survey Report for Panama.**

R. O. Smitherman, and D. D. Moss. 1 Sep 70, 71p

Contract AID/csd-2270

Descriptors: \*Aquaculture, \*Panama, \*Fisheries, Surveys, Nutrition, Education, Rivers, Lakes, Reservoirs, Ponds, Fresh water fishes, Shrimps, Catfishes, Honduras.

The report surveys the potential of fish culture as a source of low-cost protein and as the basis of a new industry. It includes data on nutrition, areas for pond construction, status of fisheries, government agencies responsible for fisheries, and fisheries training, and covers inland fisheries in rivers, lakes, reservoirs and ponds, as well as possible sites for inland research stations. It also describes culture of shrimp and catfish in Honduras. (AID abstract)

### **PB-195 913 PC A07 MF A01 General Oceanology, Inc., Cambridge, Mass. Commercial Feasibility of Fish Protein Concentrate in Developing Countries. Volume I. The Protein Situation in Korea and the Potential Role for Fish Protein Concentrate.**

Final rept.  
Oct 69, 145p Rept no. GO-8  
Contract AID/csd-2158  
Prepared in cooperation with the American Technical Assistance Corp., and Sidney M. Cantor Associates, Inc.

Descriptors: \*Fish protein concentrates, \*South Korea, \*Proteins, South Korea, \*Developing countries, \*Food, Feasibility, Nutritive value, Nutritional deficiencies, Food deprivation, Cost effectiveness, Food processing.

The report establishes that protein malnutrition exists in certain groups in Korea, and that fish protein concentrate (FPC) might contribute to ameliorating this shortage. Present economics and raw material shortages, however, mitigate against a self-priming commercial FPC operation in Korea today. However, some alternative paths for protein relief through FPC are possible. The report reviews protein nutrition, and the Korean protein system, and calculates the 'protein gap' for the groups and determines the cost/effectiveness of protein fortification. It examines the feasibility of producing FPC locally, the implications of a protein supplement program on national nutrition policies and the cost of closing the protein gap. (Author)

### **PB-195 914 PC A08 MF A01 Alabama Agricultural Experiment Station, Auburn. The Inland Fisheries Program of Thailand. Increasing Fish Production by Improved Fishcultures.**

H. S. Swingle, G. B. Pardue, R. O. Smitherman, D. D. Moss, and H. R. Schmittou. 1 Jan 70, 165p  
Contract AID/csd-2270

Descriptors: \*Aquaculture, \*Thailand, \*Fisheries, Surveys, Research, Production, Universities, Education.

The report presents materials on fishery research programs, hatchery production and fish distribution. It also covers the status of fisheries extension and production programs, inland fisheries stations and units of the Department of Fisheries, the College of Fisheries of Kasetsart University, and the Northeast Agricultural Center. It recommends an expanded program of fisheries development with technical assistance and advanced training. (AID abstract)

### **PB-195 915 PC A07 MF A01 Alabama Agricultural Experiment Station, Auburn. Fishculture Project Report for East Pakistan. Increasing Fish Production by Improved Fishcultures, Phase I.**

Final rept.  
H. S. Swingle, H. R. Schmittou, D. D. Moss, and W. A. Rogers. 1 Feb 69, 142p  
Contract AID/csd-1581

Descriptors: \*Aquaculture, \*Pakistan, \*Fisheries, Surveys, Meetings, Education, Fishing grounds, Nutrition, Proteins.

The report summarizes the results of three trips to East Pakistan. The first trip, November 23-29, 1967, concerned the present and future needs for high quality protein, the role of fisheries, organizations in fisheries education, research and management, and available research facilities. The second trip, June 19-21, was for conferences at the University of Mymensingh and the Directorate of Fisheries at Dacca. The final trip, October 26 to November 22, 1968, was to investigate fish seed farms, research stations and sites for fisheries research stations. Recommends the expansion of research facilities, plan of a pond fishery research station, periodic visits by Auburn research specialists and experiments on the reduction of seepage in ponds. (AID abstract)

### **PB-195 916 PC A06 MF A01 Alabama Agricultural Experiment Station, Auburn. Fishculture Survey Report for West Central Africa. Increasing Fish Production by Improved Fishcultures.**

D. D. Moss, G. B. Pardue, and M. J. Danner. 30 Jun 69, 125p  
Contract AID/csd-1581

Descriptors: \*Aquaculture, \*Subsaharan Africa, \*Fisheries, Surveys, Fishes, Marketing, Nutrition, Economic analysis, Processing.

The report is a survey carried out from March 30 to May 27, 1969 with visits of about one week to each of the following countries in West Central Africa: Senegal, Central African Republic, Cameroon, Nigeria, Togo, Ghana and Ivory Coast. Summarizes for each country the present general economic status, status of present fisheries, fish marketing and processing methods, and nutritional status and fish consumption. Recommends the establishment of a cooperative program of fishculture development for Ghana. (Author)

### **PB-196 296 PC A20 MF A01 Agency for International Development, Washington, D.C. Marketing Stable Food Crops in Sierra Leone. Rept. for Mar 66-Jun 67. 1967, 474p**

Descriptors: \*Farm crops, \*Sierra Leone, \*Food, Marketing, Economic development, Vegetable oils, Nuts(Fruits), Root crops, Rice, Production, Consumption, Processing, Labor relations, Statistical data, Prices, Cost engineering.  
Identifiers: Palm oil, Ground nuts, Cassava, Retail trade, Wholesale trade.

The document covers the general economic environment in which the marketing system of Sierra Leone operates, how the market system is organized and how it functions, price changes over time and between areas, marketing costs, and ways of improving the marketing system so that it



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will contribute more effectively to the economic development of the country. Special attention is given to the marketing of rice, palm oil, groundnuts and cassava. (AID abstract)

**PB-196 306** PC A03 MF A01  
Texas Tech Univ., Lubbock. Dept. of Agricultural Engineering.  
**Artificial Recharge in Water Resources Management.**  
Marvin J. Dvoracek, and Sam H. Peterson. 1970, 29p OWRR-B-041-TEX(4)

Descriptors: \*Ground water recharge, Water supply, \*Water supply, Arid land, \*Water resources, Management planning, Water conservation, Recharge wells, Semiarid land, Irrigation, Agriculture, Ground water, Sediments, Economic factors, Texas.  
Identifiers: Ogallala formation, \*Artificial recharge.

Water resources for arid and semiarid regions of the United States are only marginal at the present time and new sources of water are no longer available. Artificial recharge techniques are presented as one method of partially alleviating the problem. Artificial recharge is presented in the context of the water depletion of the Ogallala formation on the High Plains of Texas. There, as in the United States as a whole, irrigated agriculture is the major water user. Several recharge mechanisms are discussed, such as recharge wells, shafts, holes, pits, trenches, rubble cones, and water spreading. All of the methods share the problem of sediment content in water used for recharge, but the problem is not insurmountable. In some cases economic value of artificially recharged water has already outweighed the limitations. (WRSIC-abstract)

**PB-196 340** PC A03 MF A01  
Battelle Memorial Inst., Columbus, Ohio. Columbus Labs.  
**The Continued Development and Field Evaluation of the Aid Hand-Operated Water Pump.**  
Final rept.  
R. D. Fannon, Jr, and D. W. Frink. 28 Aug 70, 42p  
Contract AID/csd-2174

Descriptors: \*Piston pumps, Design, \*Well pumps, Water distribution, \*Developing countries, Well pumps, Plungers, Valves, Bushings, Materials, Cost estimates.  
Identifiers: Hand operated piston pumps.

The document based on research carried out over a period of several years on the development of a simple, efficient, hand-operated piston pump for use in developing countries. It covers plunger-valve design, selection of optimum cup material, and the evaluation of cylinder coatings, foot valves, and handle pins and bushings. (AID abstract)

**PB-196 341** PC A05 MF A01  
Joint Development Group, Saigon (Republic of Vietnam).  
**Present Situation and Possibilities of Postwar Development of Inland-Fisheries in the Mekong delta.**  
Nov 68, 96p Rept no. Working Paper-42  
Contract AID/fe-291

Descriptors: \*Aquaculture, \*Vietnam, \*Economic development, Fisheries, Fishing grounds, Hydrographic surveys, Ichthyosis, Rivers, Food processing, Agriculture, Fisheries.  
Identifiers: Mekong River, Mekong Delta, Fish marketing, South Vietnam.

The report describes the hydrographical and ichthyological features of the Mekong. Discusses the different methods of exploitation of natural water bodies and ponds, the processing and stocking of fishery products, the transportation and marketing aspects. Recommends the increase of fishing production to keep pace with population growth, raising the income of rural people, and strengthening the agricultural economy. Analyzes the interaction and integration of fisheries activities in the post-war development program. Appendices include a list of fish species in river and flooded areas of SVN and a check list of fish-culture species cultivated in SVN. A one-page bibliography is included. (Author)

ated in SVN. A one-page bibliography is included. (Author)

**PB-196 352** PC A04 MF A01  
Joint Development Group, Saigon (Republic of Vietnam).  
**A Description of Ocean Fish Marketing in Saigon.**  
Report for May-Jun 68  
Nguyen Van Thuan, Nguyen Cao Dan, and Larry L. Pressler. Jun 68, 62p Rept no. Working Paper-24  
Contract AID/fe-291

Descriptors: \*Marine fishes, Marketing, \*Economic surveys, \*South Vietnam, Commerce, Seafood, Cost engineering, Transportation, Cooperation, Interviews, Personnel, Economic development.  
Identifiers: Saigon(South Vietnam), Wholesale trade, Retail trade, Cooperatives.

The report outlines the marketing aspects of ocean fish in the Saigon-Cholon urban complex based on four weeks of research visiting wholesale and retail markets, and interviews with dealers, boatowners, truckowners, police and consumers. It includes data on pricing, operations of wholesalers, transportation costs and retailers. Appendices contain information on the fishing cooperatives at Rach Gia and Ham Tan. (AID abstract)

**PB-196 355** PC A03 MF A01  
Auburn Univ., Ala. International Center for Aquacultures.  
**Fishculture Survey Report for Peru.**  
R. O. Smitherman, and D. D. Moss. 30 Sep 70, 50p  
Contract AID/csd-2270

Descriptors: \*Aquaculture, \*Peru, \*Fisheries, Peru, Surveys, Nutrition, Trout, Geography, Economic factors, Education, Bibliographies.  
Identifiers: Lake Titicaca.

The report surveys two regions to assess the status of trout fishery of Lake Titicaca and to provide technical advice on the development of warm-water aquacultures in the Amazonas Region. It includes data on geography, aspects of nutrition and economics, status of fisheries, government agencies responsible for fisheries, fisheries training and inland fisheries. Appendices include list of ornamental fishes exported from Amazonas and a list of fishes in the Iquitos area. (AID abstract)

**PB-197 104** HC A03 MF A01  
Agency for International Development, Washington, D.C.  
**A.I.D. Spring Review of Land Reform. June 2-4, 1970. Findings and Implications for A.I.D.**  
Elizabeth Carter. Dec 70, 33p Rept no. AID-SR/LR-70-13  
See also Volume 12, PB-195 326.

Descriptors: \*Land, Management, \*Developing countries, Policies, \*Counseling, Effectiveness, Meetings, Reviews, Distribution theory, Political objectives, South Asia, North Africa, Middle East, Latin America, Cost analysis, Japan.  
Identifiers: \*Land reform, Alternatives.

The paper contains findings and implications deriving from A.I.D.'s Spring Review of Land Reform, 1970. The findings are: there is a clear economic case for land reform; both the political will and political capacity for land reform are critical; land reform is likely to be politically stabilizing over the long run; urbanization is not an adequate alternative to land reform; colonization has not been a viable alternative to land reform; complementary measures are important for a reform's success. The implications are: land tenure is a significant dimension in overall development; support of land reform need not be withheld for fear of adverse economic results; where a dominant political will is lacking A.I.D. should take careful cognizance of what probable effects its assistance program may have on either prolonging or ameliorating existing inequities in land tenure; A.I.D. should not support a land reform which is basically just window dressing; external assistance may be constructively applied on many aspects of the reform; the question of how and when a land reform should be carried

out must be determined by each individual country; these findings and implications point clearly to A.I.D. staffing needs. (Author)

**PB-197 157** PC A10 MF A01  
Massachusetts Inst. of Tech., Cambridge. Sea Grant Project Office.  
**The Economics of Fish Protein Concentrate.**  
J. W. III Devanney, and G. Mahnken. 20 Nov 70, 202p\* Rept no. MITSG-71-3

Descriptors: \*Fish protein concentrates, Economics, \*Nutrition, \*Developing countries, Feasibility, Econometrics, Benefit cost analysis, Cost effectiveness, Chile, Standards, Requirements, Analysis of variance.  
Identifiers: Sea Grant program.

The report examines the economic feasibility of fish protein concentrate in two contexts: as a nutritional supplement in the diet of a developing country, and as a competitive food additive in the United States. The report examines the subject with special reference to the role that the United States Government should play in the development of FPC. Fish protein concentrate designates any stable powder resulting from the removal of oil and water from fish which is aimed at human consumption. When we are referring to a particular variety of FPC, we will attempt to make this specialization clear either explicitly or by the context.

**PB-197 758** PC A09 MF A01  
Greenleigh Associates, Inc., New York.  
**An Evaluation of Consumer Action and Urban Cooperative Programs. Volume I: Summary of Findings**  
Final rept. 1 Jun 69-31 Sep 70.  
Feb 71, 185p\* OEO-LN-862  
Contract OEO-B99-4873  
See also Volume 2, PB-197 759.

Descriptors: \*Purchasing, Coordinated procurement, \*Consumers, Economic factors, Cooperation, Financing, Project planning, Economic development, Marketing, Credit, Evaluation.  
Identifiers: Low income consumers, Credit unions, Cooperatives, \*Consumer's cooperatives, Marketing cooperatives, Buying clubs, Small merchants cooperatives, Cooperative enterprises, Service cooperatives.

The report presents a study to determine the effectiveness of OEO's Consumer Action and Urban Cooperative Program. The goals of this program were to aid low-income consumers through the establishment of cooperatives and credit unions and to encourage the involvement of outside capital in economic enterprises. (OEO abstract)

**PB-197 759** PC A12 MF A01  
Greenleigh Associates, Inc., New York.  
**An Evaluation of Consumer Action and Urban Cooperative Programs. Volume II: Individual Project Reports**  
Final rept. 1 Jun 69-31 Sep 70.  
Feb 71, 269p\* OEO-LN-863  
Contract OEO-B99-4873  
See also Volume 1, PB-197 758.

Descriptors: \*Purchasing, Coordinated procurement, \*Consumers, Economic factors, Cooperation, Financing, Project planning, Economic development, Marketing, Credit, Evaluation.  
Identifiers: Cooperatives, Credit unions, Low income consumers, \*Consumer's cooperatives, Marketing cooperatives, Service cooperatives, Cooperative enterprises, Buying clubs.

Evaluations are given of the following individual projects: Consumer action program for Bedford-Stuyvesant, Inc. (CABS); Lower east side economic development association for cooperatives (LE-SEDAO); New York institute for consumer education and development (NYI); Tulsa economic opportunity task force; Metropolitan cooperative services, inc.; Newark personal loan program (NPLP); Bay area neighborhood development foundation; Rural action for better consumer development; Watts labor community action committee; Pilsen neighbors community council; Action for Boston community development; Martin Luther King/Arthur Capper Store; Kleberg county con-



sumers', inc.; Grocery bag store; Detroit consumers federal credit union.

**PB-197 992** **PC A03 MF A01**  
Puerto Rico Univ., Mayaguez. Agricultural Experiment Station.

**Water Requirements of Sugarcane Under Irrigation in Lajas Valley, Puerto Rico**  
Roberto Vazquez. Jul 70, 42p Bull-224, UPRICO-WRRI-FR-71-5  
Also available as Rept. no. OWRR-A-005-PR(1).

Descriptors: \*Sugarcane, Water supply, \*Irrigation, \*Puerto Rico, Soil water, Efficiency, Methodology, Fertilizers, Nitrogen inorganic compounds, Production.  
Identifiers: Lajas Valley.

Field experiments were conducted in Puerto Rico at the Lajas Substation to determine optimum soil moisture conditions necessary to produce maximum sugarcane and sugar yields. Twenty irrigation regimes were tested. Some of the plots were irrigated frequently and others were irrigated less frequently in the active root zone throughout the growing period. Nitrogen fertilizer treatments were tested at the rate of 200 and 300 pounds per acre per crop. Data were taken for a 13-month plant cane and two 12-month ratoons of sugarcane. The plant cane used more water than the ratoon crop. The mean consumptive use per day was 0.160 inch for plant cane and 0.154 inch for ratoon in the frequently irrigated plots throughout the growing period. The average of the combined yields of a plant cane and two ratoons were 73.67 tons of sugarcane and 7.80 tons of sugar per acre in the frequently irrigated plots and 59.37 tons of sugarcane and 6.40 tons of sugarcane per acre in the less frequently irrigated plots. (WRSIC abstract)

**PB-198 035** **PC A05 MF A01**  
California Univ., Berkeley. Inst. of Transportation and Traffic Engineering.

**Opportunities for Cost Reduction in the Design of Transport Facilities for Developing Regions. Annex to Volumes 1 and 2**  
Special rept.  
Dec 70, 98p  
Contract DOT-OS-A9-004  
See also Volume 1, PB-195 597, and Volume 2, PB-195 598.

Descriptors: \*Roads, Cost engineering, \*Construction, Roads, \*Transportation, \*Developing countries, Design standards, Mathematical models, Maintenance, Operating costs, Pavements, Vehicular traffic, Cost control.  
Identifiers: Low cost road construction, Technical assistance, Tradeoffs.

The annex is a supplement to a study that examines designs of transport facilities in the developing countries with a view toward reducing initial and/or operating costs, or to reducing costs devoted to imported elements. For the annex, research is focused on economic and engineering aspects of low-cost road construction. A production-function based model is developed for road maintenance cost estimation. Surface maintenance is considered in detail. Principal variables included are time, climate, and traffic volume. Another section of the annex contains a discussion of tradeoffs between construction costs and maintenance costs. (Author)

**PB-198 125** **PC A06 MF A01**  
Robert S. Kerr Water Research Center, Ada, Okla. Treatment and Control Research Program.

**Water Quality Management Problems in Arid Regions**  
Water pollution control research series  
James P. Law, Jr. and Jack L. Witherow. Oct 70, 109p\* FWQA-13030-DYY-06/69

Descriptors: \*Arid land, \*Water pollution, \*Nitrates, Water pollution, \*Sewage treatment, \*Water reclamation, \*Agricultural wastes, Water pollution, \*Irrigation, Water pollution, Denitration, Algae, Salinity, Desalting, Water quality, Industrial wastes, Ground water, Chemical removal(Water treatment).

An international conference entitled 'Arid Lands in a Changing World' sponsored by the American Association for the Advancement of Science Committee on Arid Lands and the University of Arizona, was held at Tucson in June, 1969. The report presents a selected group of the papers presented at those sessions which should benefit those concerned with water quality management problems in arid regions. The title of the papers included in this report are as follows: Nitrate removal from agricultural wastewater; the effects of salinity standards on irrigated agriculture in the Colorado River basin; Problems of pollution of irrigation waters in arid regions; Water quality requirements and reuse of wastewater effluents; Salinity control in return flow from irrigated areas--a demonstration project; Water quality control problems in inland sinks; Natural pollution in arid land waters; Distillation of wastewaters: A water resource for arid regions; and Animal waste runoff--a major water quality challenge. (WRSIC abstract)

**PB-199 709** **PC-GPO/MF A01-NTIS**  
Federal Water Quality Administration, Washington, D.C.

**National Symposium on Food Processing Wastes Proceedings (1st), held at Portland, Oregon on 6-8 April 1970**

Water pollution control research series.  
Apr 70, 400p FWQA-12060-04/70  
Paper copy available from GPO \$3.00 as I67.13/4:12060-04/70.

Descriptors: \*Water pollution, \*Industrial wastes, \*Food processing, Water pollution, \*Industrial waste treatment, Food processing, Meetings, Water quality, Potatoes, Fruits, Tomatoes, Sugarbeets, Seafood, Vegetables, Activated sludge treatment, Fungi, Sewage treatment, Agricultural wastes, Economic analysis, Canneries, Rice, Utilization, Waste disposal, Feeding stuffs, Trickling filtration, Aeration.  
Identifiers: \*Water pollution control, \*Water pollution control equipment, Potatoe processing, Beet processing.

Some of the topics reported and discussed include the following: Aerobic secondary treatment of potato processing wastes; Use of fungi imperfecti in waste control; Combined treatment of domestic and industrial wastes by activated sludge; Aerobic treatment of liquid fruit processing waste; Cannery waste treatment by two-stage aeration process; Lime treatment and in-plant reuse of an activated sludge plant effluent in the citrus processing industry; Seafoods processing; Cannery waste treatment by a high solids activated sludge process; Concentration of sugarbeet wastes for economic treatment with biological systems; Reconditioning and reuse of olive processing brines; Trickling filter treatment of food canning waste water; Wurdd's task force on agricultural pollution; In-field processing of tomatoes; 'Dry' caustic peeling of vegetables and fruits; Pilot plant experience of USDA-Magnuson dry caustic peeling process; Possible uses of uni-flow filter; Animal feeds from vegetable wastes; Rice hull utilization.

**PB-199 799-T** **PC A04 MF A01**  
Bureau of Commercial Fisheries, Washington, D.C. Office of Foreign Fisheries (Translations).

**Manual on the Biotechnology of the Propagation and Rearing of Phytophagous Fishes**

May 71, 52p  
Trans. of Rukovodstvo po Biotehnike Pazvedeniya i Vyrashchivaniya Rastitelnoyakh Ryb, Moscow, 1970 72p, by Robert M. Howland.

Descriptors: \*Fishes, Aquaculture, \*Aquaculture, Manuals, Feeding habits, Nutrients, Algae, Phytoplankton, Breeding, Embryology, Physiology, Translations, Zooplankton.  
Identifiers: \*Phytophagous fishes, Cyprinidae.

The fareastern phytophagous fishes - the white and variegated silver-carps, and the white amur - are new objects of fish culture. Despite the brief period of their propagation here and the fact that experimentation concerning their commercial adoption is far from complete, these fishes comprise an ever greater share of the fish production generated at fish farms. In such areas as the Krasnodar region and the Uzbek SSR, they now comprise about one-half of the market fish reared.

Pond culture currently is undergoing a fundamental reorganization, transforming from the monoculture of carp to the more highly productive and economically profitable polyculture. This manual considers the cumulative experience and deals with the latest questions on the propagation and rearing of phytophagous fishes. (Author)

**PB-200 967** **PC A03 MF A01**  
Oregon Univ., Eugene. Bureau of Governmental Research and Service.

**Self-Help Housing in Oregon**  
Innovative study series no. 5.  
1970, 50p  
See also Rept. no. 4, PB-200 964.

Descriptors: \*Residential buildings, Projects, \*Regional planning, \*Oregon, Construction, Methodology, Rural areas, Cost analysis, Feasibility, Economic surveys, Statistical data, Sociometrics, Public administration, Demography.  
Identifiers: \*Self help housing, \*Low income housing.

Self-help housing, the use of one's own nonprofessional labor in construction of a dwelling, use to be a popular way to build a house, but with the advent of labor specialization, complicated construction materials and techniques, financing mechanisms, building codes, and limited access to free materials, it has become less important in the United States. The report describes the housing program in the Willamette Valley in Oregon.

**PB-201 729** **PC A04 MF A01**  
Mississippi State Univ., State College. Water Resources Research Inst.

**Community Organization and Rural Water System Development**  
John H. Peterson, Jr. 1971, 60p OWRR-B-005-MISS(1)

Descriptors: \*Water supply, Rural areas, \*Communities, Water supply, Community development, Urban planning.  
Identifiers: Rural water system development, Community organization.

Rural communities in a representative county were studied to determine the range of community experiences in water system development and to establish the relationship between community organization and water system development. (WRSIC abstract)

**PB-202 778-Set** **PC-GPO**  
Mitre Corp., McLean, Va.

**A Technology Assessment Methodology**  
Jun 71, 1570p\* in 7 vols Rept no. MTR-6009  
Contract OST-26  
Consists of Volumes 1-6 and Project Summary. Individual volumes are available in paper copy only at various prices. See PB-202 778-1 thru PB-202 778-7.

Descriptors: \*Research, Assessments, Forecasting, Social change, Cost effectiveness, Benefit cost analysis, Decision making, Social sciences, Sewage treatment, Aquaculture, Enzymes, Air pollution, Computers, Methodology.  
Identifiers: \*Technology assessment.

The research described is concerned with the development of an analytical framework and a structured procedure that can be used for anticipating the social impacts of major technologies. Five examples are presented dealing with the following: Automotive emissions; Computers--communications; Enzymes (Industrial); Mariculture (Sea farming); and Water pollution from domestic wastes.

**PB-202 778-1** **PC A14**  
Mitre Corp., McLean, Va.

**A Technology Assessment Methodology. Volume I. Some Basic Propositions**  
Final rept.

Martin V. Jones. Jun 71, 307p\* Rept no. MIR-6009-1  
Contract OST-26  
Also included in PB-202 778-Set, PC\$31.50, MF\$9.00. See also PB-202 778-2.



Descriptors: \*Research, Assessments, \*Research management, Assessments, Forecasting, Social change, Cost effectiveness, Benefit cost analysis, Decision making, Social sciences, Project management, Methodology.  
Identifiers: \*Technology assessment.

This is one of six reports on the subject of technology assessment prepared by MITRE for the Office of Science and Technology, Executive Office of the President. The purpose of this project was to develop a standard, structured method for making studies directed toward anticipating and influencing the societal impacts of new technology applications. This volume describes the standard methodology that was developed. The other volumes are 'pilot' assessment studies covering particular fields of technologies that were conducted to help test, develop, and illustrate the standard assessment methodology. (Author)

**PB-202 778-2** **PC A10**  
Mitre Corp., McLean, Va.  
**A Technology Assessment Methodology. Volume II. Automotive Emissions**  
Final rept.  
Willis E. Jacobsen. Jun 71, 205p\* Rept no. MTR-6009-2  
Contract OST-26  
Also included in PB-202 778-Set PC\$31.50, MF\$9.00. See also PB-202 778-1 and PB-202 778-3.

Descriptors: \*Air pollution, Assessments, \*Exhaust gases, \*Automobile engines, Forecasting, Social change, Benefit cost analysis, Cost effectiveness, Decision making, Methodology, Public health, Internal combustion engines, External combustion engines, Environmental surveys, Government policies, Economic analysis, Highway transportation, Abatement, Mass transportation, Monitors.  
Identifiers: \*Technology assessment, \*Automobile exhaust, Hybrid vehicular propulsion.

The pilot study on automotive emission control is one in a series of five, each addressing different technologies. A framework for appraising societal influences of control strategies (technological and nontechnological) for reducing noxious automotive emissions is developed and illustrative examples, based on a proposed cost/benefit model, are presented. (Author)

**PB-202 778-3** **PC A12**  
Mitre Corp., McLean, Va.  
**A Technology Assessment Methodology. Volume III. Computers-Communications Networks**  
Final rept.  
Hugh V. O'Neill. Jun 71, 261p\* Rept no. MTR-6009-3  
Also included in PB-202 778-Set PC\$31.50, MF\$9.00. See also PB-202 778-1 and PB-202 778-4.

Descriptors: \*Computers, Assessments, \*Computer systems hardware, Man machine systems, Telecommunication, Information systems, Data processing, Time sharing, Real time operations, Data, Forecasting, Social change, Cost effectiveness, Benefit cost analysis, Decision making, Social sciences, Methodology.  
Identifiers: \*Technology assessment, \*Computer privacy.

The paper describes a pilot computer technology assessment study. The study has as its goal the development and illustration of technological assessment methodology and in addition, as a secondary objective, the investigation of certain salient segments of the general computer situation. The report includes: a summary; task definition; technology descriptions; state of society/universe assumptions, attributes, and conditions; relevant impact areas; initial impact analysis; action options and recommendation for future research and development program; forecasts/projections, uncertainty and analysis of future impacts; and, conclusions and recommendations. (Author)

**PB-202 778-4** **PC A11**  
Mitre Corp., McLean, Va.

**A Technology Assessment Methodology. Volume IV. Enzymes (Industrial)**

Final rept.  
David H. Rubin. Jun 71, 226p\* Rept no. MTR-6009-4  
Contract OST-26  
Also included in PB-202 778-Set PC\$31.50, MF\$9.00. See also PB-202 778-3 and PB-202 778-5.

Descriptors: \*Enzymes, Assessments, \*Industrial engineering, Enzymes, \*Chemical engineering, Enzymes, \*Food industry, Enzymes, Forecasting, Social change, Benefit cost analysis, Cost effectiveness, Decision making, Methodology, Environmental surveys, Economic analysis, Pollution, Medicine, Public health, Detergents, Law(Jurisprudence), Models, Methodology.  
Identifiers: \*Technology assessment.

A general technology assessment methodology is used to assess the impacts of developments in enzyme science and technology with particular emphasis on industrial applications. Forecasts are presented of likely technological developments and application areas are described in which the impacts have significant societal interactions. Case studies include detergents, biodegradable containers, conversion of dextrose to starch, possible substitute for cane sugar, cellulases, and enzymes used against oil spills. Forecasts are made of the societal impact areas which will be most affected by enzyme technology. First-order impacts and higher order interactions are presented. Action options are described which could influence the developments of enzyme technology in desirable directions. (Author)

**PB-202 778-5** **PC A10**  
Mitre Corp., McLean, Va.  
**A Technology Assessment Methodology. Volume V. Mariculture (Sea Farming)**  
Final rept.  
Robert C. Landis. Jun 71, 205p\* Rept no. MTR-6009-5  
Contract OST-26  
Also included in PB-202 778-Set PC\$31.50, MF\$9.00. See also PB-202 778-4 and PB-202 778-6.

Descriptors: \*Aquaculture, Assessments, \*Developing countries, Aquaculture, Benefit cost analysis, Forecasting, Environmental surveys, Economic analysis, Decision making, Methodology, Human nutrition, Cost effectiveness, International trade, Proteins, Water pollution, Infant nutrition, Social change, Models, Government policies, Fisheries.  
Identifiers: \*Technology assessment.

A general technology assessment methodology is used to determine the impacts of mariculture on the developing countries. The technology is confined to application in coastal and brackish waters. A quantitative impact analysis of economic and social factors is shown for the years 1975-1989. Various action options are offered and a revised impact forecast is given for increased impact on the malnutrition problem. The problems and constraints to accelerated mariculture application are analyzed, and a forecast of 20 million tons of mariculture production in 1985 is made. Also, a subjective probability of which countries will apply mariculture is given. (Author)

**PB-202 778-6** **PC A15**  
Mitre Corp., McLean, Va.  
**A Technology Assessment Methodology. Volume VI. Water Pollution: Domestic Wastes**  
Final rept.  
Victor D. Wenk. Jun 71, 331p\* Rept no. MTR-6009-6  
Contract OST-26  
Also included in PB-202 778-Set PC\$31.50 and MF\$9.00. See also PB-101 778-5 and PB-202 778-7.

Descriptors: \*Sewage treatment, Assessments, \*Water pollution, \*Sewage, Benefit cost analysis, Septic tanks, History, Forecasting, Social change, Environmental surveys, Decision making, Methodology, Economic analysis, Government policies, Cost estimates, Soil chemistry, Abatement, Nutrients, Cost effectiveness, Chemical

removal(Sewage treatment), Models, Land use, Ground water.  
Identifiers: \*Technology assessment.

A general technology assessment methodology is used to determine the impacts of widespread use of individual home sewage treatment technology during the 1970-1989 time period. The effects of varying rates of diffusion of this technology are analyzed in terms of selected measures of economic and environmental impact. Social and institutional impacts are discussed. Various action options available to identified interest groups are analyzed in terms of their effect upon technology diffusion rates and specific impact areas. The normative nature of this technology assessment called for the use of a dynamic interactive model of the technology diffusion process. (Author)

**PB-202 778-7** **PC A03**  
Mitre Corp., McLean, Va.  
**A Technology Assessment Methodology. Project Summary**  
Final rept.  
Martin V. Jones. Jun 71, 35p\* Rept no. MTR-6009-7  
Contract OST-26  
Also included in PB-202 778-Set PC\$31.50 and MF\$9.00. See also PB-202 778-6.

Descriptors: \*Research, Assessments, Forecasting, Social change, Cost effectiveness, Benefit cost analysis, Decision making, Social sciences, Sewage treatment, Aquaculture, Enzymes, Air pollution, Methodology.  
Identifiers: \*Technology assessment.

The paper summarizes the findings of an exploratory technology assessment project jointly sponsored by the Office of Science and Technology, Executive Office of the President, and The MITRE Corporation. The objective of the project was to develop an analytical framework and a structured procedure that could be used for anticipating the societal impacts of major technologies. Detailed findings are reported in six volumes. (Author)

**PB-202 936** **PC A14 MF A01**  
Illinois Univ., Urbana. Dept. of Civil Engineering.  
**Response and Energy-Dissipation of Reinforced Concrete Frames Subjected to Strong Base Motions**  
Civil engineering studies  
Polat Gulkan, and Mete A. Sozen. May 71, 304p  
Rept nos. Structural Research Ser-377, UILU-ENG-71-2013  
Grant NSF-GK-1118

Descriptors: \*Reinforced concrete, Dynamic response, \*Concrete structures, \*Earthquakes, Computerized simulation, Earth pressure, Static loads, Framed structures, Environment simulators, Damping capacity, Frequency response, Earthquake resistant structures.

The report contains tests and analyses of reinforced concrete frames subjected to simulated earthquake motions. (Author)

**PB-203 326** **PC A03 MF A01**  
Agency for International Development, Washington, D.C. Office of Science and Technology.  
**Environmental Considerations for Construction Projects**  
Jul 71, 29p Rept no. TA/OST-71-1

Descriptors: \*Construction, \*Environmental surveys, Project planning, Highways, Harbor facilities, Airports, Irrigation systems, Dams, Electric power plants, Petroleum industry, Mining, Smelting, Paper industry, Industrial plants, Fertilizers, Sewage treatment, Air pollution, Water pollution, Noise reduction.  
Identifiers: Solid waste disposal.

Environmental considerations for twelve categories of construction projects are presented, in the form of key questions, designed to serve as general points of departure for analyzing the potential environmental consequences of proposed projects. Projects discussed are: road construction; port and harbor development; airports; irrigation systems; dam construction; power plants; petro-



leum-petrochemical industry; mining; smelting; pulp and paper industry; fertilizer plants; and sewage treatment.

**PB-203 327** **PC A11 MF A01**  
American Univ., Washington, D.C.  
**Computer Technology in Developing Countries. Proceedings of Symposium Held at American University, Washington, D.C. on 22-23 March 1971**  
Final rept.  
Mar 71, 231p\* TA/OST-AU-71-1  
Contract AID-csd-2905

Descriptors: \*Data processing, Utilization, \*Developing countries, \*Computer programming, Computer systems hardware, Specialized training, Management planning, Instructions, Cost analysis, Foreign aid, Meetings.

The report includes papers presented at a two-day symposium on seven areas of the use of computer technology in developing countries and transcripts of the discussions of each topic. A summary of the symposium was prepared by Professor Lowell H. Hattery of the American University. (Author)

**PB-203 328** **PC A04 MF A01**  
National Academy of Sciences, Washington, D.C.  
**East Pakistan Land and Water Development as Related to Agriculture**  
Final rept., Aug-Oct 70.  
Jan 71, 74p TA/OST-NAS-71-29  
Contract AID-csd-2584  
A report of an Ad Hoc Panel of the Board on Science and Technology for International Development of the National Academy of Sciences. National Research Council.

Descriptors: \*Agriculture, \*Pakistan, \*Land development, Agriculture, \*Water supply, Agriculture, Economic development, Management planning, Education, Food, Meetings, Employment, Research, Control.

The report has been prepared by an ad hoc Panel under the auspices of the Office of the Foreign Secretary, National Academy of Sciences, National Research Council, for the Office of Technical Support, Bureau for Near East and South Asia of the Agency for International Development. The Panel consulted with various scientists and reviewed the proposals of the International Bank for Reconstruction and Development for an action program. The Panel met three times. Agendas for the meetings are included, as well as a list of staff, discussants and observers. (Author)

**PB-203 329** **PC A05 MF A01**  
National Academy of Sciences, Washington, D.C.  
**Research Priorities and Problems in the Execution of Research in Ghana. Part I. Summary. Proceedings of the Workshop on Scientific Research Held at Accra on 18-22 January 1971**  
Jan 71, 77p TA/OST-NAS-71-30  
Contract AID-csd-1122  
See also Part 2, PB-203 330. Prepared in cooperation with Council for Scientific and Industrial Research, Universities of Ghana, Accra, Ghana.

Descriptors: \*Agriculture, Research, \*Ghana, Agriculture, Meetings, Reviews, Biology, Agricultural economics, Human factors, Resources, Universities.

Summary of the Proceedings of the Workshop on Scientific Research held in Accra from 18th to 22nd January 1971, attempts to present the salient points in the papers read and the gist of the discussions which took place. Listed are the names of the participants, and the speakers. Keynote addresses are summarized. Papers presented at the Workshop are summarized, and discussion following presentation of papers is summarized. Also included are summaries of reports on: Outstanding Matters Arising from Previous Discussions; A Report of the Sub-Committee on Extension; and Report of the Committee on the Assignment of Research Priorities. (Author)

**PB-203 330** **PC A15 MF A01**  
National Academy of Sciences, Washington, D.C.

**Scientific Research in Ghana. Part II. Full Report. Proceedings of the Workshop on Research Priorities and Problems in the Execution of Research in Ghana Held in Accra 18-22 January 1971**  
Final rept.  
1971, 330p TA/OST-NAS-71-31  
Contract AID-csd-1122  
See also Part 1, PB-203 329. Prepared in cooperation with Council for Scientific and Industrial Research, Universities of Ghana, Accra, Ghana.

Descriptors: \*Agriculture, Research, \*Ghana, Agriculture, Meetings, Industries, Agricultural economics, Human factors engineering, Resources, Soil surveys, Biology, Maps.  
Identifiers: Accra(Ghana).

A Foreword to this Volume has been written by Mr. Modjaben Dowuona, Chairman, National Council for Higher Education/Council for Scientific and Industrial Research. Keynote speakers and participants are listed. Texts of keynote addresses are given, as well as copies of papers presented. Transcripts of the discussions of each paper presented are given. Appendix I: Soil Research in Ghana - Achievements and Problems. Appendix II - Workshop Programme. (Author)

**PB-203 331** **PC A04 MF A01**  
National Academy of Sciences, Washington, D.C.  
**The International Development Institute**  
Jul 71, 67p TA/OST-NAS-71-32  
Contract AID-csd-2584  
A report of an Ad Hoc Committee of the Board on Science and Technology for International Development.

Descriptors: \*International relations, Organizations, \*Foreign aid, Economic development, Research management, Manpower.

This is a report prepared by a committee convened by the National Academy of Sciences in October 1970 at the request of the Agency for International Development, to consider the character, purposes, and functions of a United States International Development Institute. Listed are the members of the ad hoc Committee on the International Development Institute and members of the Board on Science and Technology for International Development, Office of the Foreign Secretary, National Academy of Sciences. The report endorses the concept of such an Institute, and outlines proposals for its organizational structure and program objectives.

**PB-203 379** **PC A03 MF A01**  
National Academy of Sciences, Washington, D.C.  
**International Aspects of Man's Effect Upon Environment**  
Summary rept.  
Roger Revelle. Jan 70, 29p TA/OST-NAS-70-27  
Contract AID/csd-1122

Descriptors: \*Foreign aid, \*Environmental surveys, \*Pollution, Foreign aid, \*Developing countries, Environmental surveys, International assistance, Legislation, Pesticides, Dams, Reservoirs, Water quality, Ecology, Government policies.

The summary on Environmental Aspects of Foreign Assistance Programs by the Agency for International Development (AID) presents conclusions on the following topics: Which aspects of AID international assistance have the possibility of creating problems of environmental degradation; Which of the problem areas should receive priority attention; How may AID strengthen the capabilities of the United States and the developing countries in dealing with environmental problems. A list of fourteen major areas in which man is having seriously deleterious effects upon his environment is attached.

**PB-203 491** **PC A02 MF A01**  
New Mexico State Univ., Clovis. Plains Branch Agricultural Experiment Station.  
**Utilization of Water in a Semi-Arid Region**  
Completion rept.  
H. Dale Fuehring. Jun 71, 5p OWRR-A-027-NMEX(1)

Descriptors: \*Water supply, Utilization, \*Arid land, Moisture, Watersheds, Rainfall, Volume, Herbicides, Agriculture, Drought.  
Identifiers: Atrazines, Propazines.

In order to assess the value for dryland cropping in a semi-arid region of concentrating rainfall by means of micro-watersheds, a study was established with width of micro-watershed, width of growing bed, plant population, and applied level of nitrogen fertilizer as variables. Due to very low rainfall, little water was available for concentration and yields of winter wheat and winter barley were very low and were decreased with increasing amount of watershed area (proportionately less of area planted). A study on use of herbicides indicates propazine and atrazine applied on the watershed areas may control weeds without injury to crops. It was concluded that the first year results of the study were atypical because of extreme drought and that several years data will be necessary in order to sample various amounts and patterns of annual rainfall and to determine the cumulative effects. (Author)

**PB-203 608-D** **PC A02**  
Agricultural Research Service, Washington, D.C.  
**Boll Weevil Control Program (Cooperative Diapause Control Program), Texas and Mexico**  
Draft environmental impact statement.  
22 Oct 71, 18p

Descriptors: \*Environmental surveys, Pest control, \*Texas, Environmental surveys, \*Mexico, Environmental surveys, \*Insect control, Environmental surveys, Cotton plants, Animal migrations, Insecticides, Toxicology, Birds, Bees, Rodents, Vegetation.  
Identifiers: \*Environmental impact statements, \*International cooperation, Malathion, \*Boll weevils, Aldicarb.

The project is concerned with a pesticide program on the Texas-Mexico border, for the primary purpose of boll weevil control. Adverse impact effects anticipated include the effects of damage to non-target insects and other organisms.

**PB-203 844** **PC-GPO/MF A01-NTIS**  
Hawaii Univ., Honolulu.  
**Salinity Tolerances of Certain Tropical Soils and Relationships Between Sodium Ion Activities and Soil Physical Properties**  
Research and development progress rept.  
S. A. El-Swaify, L. D. Swindale, and G. Uehara.  
Mar 69, 55p OSW-PR-419  
Contract DI-14-01-0001-673  
Paper copy available from GPO \$0.55 as I1.88:419.

Descriptors: \*Soil properties, \*Tropical regions, \*Irrigation, Soils, \*Soils, Salinity, Deterioration, Demineralizing, Salt water, Sodium inorganic compounds, Calcium inorganic compounds, Magnesium inorganic compounds, Soil water, Physical properties, Ions, Acidity, Colloiding, Percolation, Hawaii.  
Identifiers: Tropical soils.

Two tropical soils from Hawaii were tested for salinity tolerances, the ability of the soils to resist physical deterioration by saline waters. Hydraulic conductivity measurements showed that presently permissible limits of salinity and sodium in irrigation water can be safely raised because significant hazardous physical conditions are not likely to occur. Both soils possess high resistance to detrimental peptization even when exposed to extreme sodic conditions. The original acidities of soils are highly resistant to change under leaching. Neither soil had a tendency to accumulate soluble salts by extraction from percolating saline waters. The direct determination of ionic activities for sodium, calcium and magnesium ions as a new and more fundamental tool in soil salinity work is discussed. (Author)

**PB-204 407** **PC A06/MF A01**  
National Academy of Sciences-National Research Council, Washington, D.C.



**Philippines-U.S. Workshop on Cooperation in Science and Technology (2nd). Asilomar Conference Grounds, Pacific Grove, California 6-10 November 1966**

1966, 112p TA/OST NAS-66-5.1

Contract AID/csd-1122

See also report no. 1, PB-203 293-U.

Descriptors: \*Economic development, \*International relations, \*Philippines, Economic development, Industrial management, Food, Nutrition, Demography, Agriculture, Natural resources, United States, Oceanography, Fisheries, Meetings, California.

The report is a record of the U.S.-Philippines Workshop on Cooperation in Science, Technology and Development held in Pacific Grove, California, November 6-10, 1966 and Washington, D.C., November 13-18, 1966. Participants are listed. The report includes a summary, recommendations for future, collaboration, session reports and contributed papers. (Author)

**PB-204 408 PC A03/MF A01**

Agency for International Development, Washington, D.C. Office of Science and Technology.

**Water Quality Standards and International Development**

Oct 71, 34p Rept no. TA/OST-71-4

Descriptors: \*Water quality, Standards, \*United States, Water quality, \*Developing countries, Water quality, Potable water, Surface waters, Water supply, Chemical analysis, Bacteria, Radioactive contaminants, Water pollution, Control, Planning.

The report summarizes progress to date in establishing water quality standards in the United States and in developing countries. Its purpose is to assist those concerned broadly with environmental policies in developing countries to better understand past efforts and future needs in this field. (Author)

**PB-204 519 PC A06/MF A01**

Illinois Inst. for Environmental Quality, Chicago.

**Septic Tanks and the Environment**

Final rept.

J. W. Patterson, R. A. Minear, and T. K. Nedved.

Jun 71, 105p\* Rept no. IIEQ-71-2

Descriptors: \*Septic tanks, \*Reviews, \*Public health, Septic tanks, \*Water pollution, Septic tanks, Performance evaluation, Legislation, Illinois, Standards, History, Environmental surveys, Sludge disposal, Nitrates, Soil properties, Percolation, Nitrogen inorganic compounds, Phosphorus inorganic compounds.

The report reviews and evaluates the available literature on septic tanks, and influence of septic tanks on public health and environmental quality. The consistently poor performance of septic tanks indicates that other waste disposal methods are necessary in densely populated areas and that more rigorous regulation of design criteria, installation, and operation are required in sparsely inhabited areas suitable for septic tank installations. The report is intended to form the basis for appropriate administrative or legislative action in Illinois. Its bibliography contains 127 items. (Author)

**PB-205 287 PC A15/MF A01**

Agency for International Development, Washington, D.C.

**Progress Through Modern Processes and Tools**

George D. Thomas. Mar 70, 332p\* TA/OST AN-70-3-1

Descriptors: \*Production methods, Manuals, \*Machine tools, Design, Production control, Quality control, Cost engineering, Drafting(Drawing), Tooling, Steel, Materials specifications, Jigs, Fixtures, Clamps, Bushings, Carbide tools, Dies, Die casting, Molding machines, Foundry engineering.

Basic materials are presented which are intended to help acquaint production planners and key production workers with the proper use of modern production techniques and the proper design and manufacture of standard production tools. Experi-

ence has shown that these standard techniques and tools will aid in the improvement of production efficiency, reduction of costs, improvement of quality, and making of component parts interchangeable. The specific topics covered include: Organizing for the specific control of quality and production; Cost reduction; Drafting room practice and tool engineering data; Steel specifications--heat-treatment and uses; Jigs and fixtures; Standard clamps; Standard bushings; Carbide cutting tools; Steel stamping dies; Die casting instructions; Compression and transfer molding equipment (plastic dies); Foundry equipment and processes.

**PB-205 761 PC A07/MF A01**

Trust Territory of the Pacific Islands, Saipan, Mariana Islands. Economic Development Div.

**Copra Processing in the Trust Territory. A Report to the Congress of Micronesia**

William H. Stewart. 1971, 138p

Descriptors: \*Mariana Islands, \*Copra processing, Economic development, Vegetable oils, Industrial plants, Market research, International trade, Revenue, Food consumption.

Identifiers: Coconut meal.

The report analyzes the factors involved in processing copra in the Trust Territory into crude coconut oil and copra cake. The report is more than a feasibility analysis in that it discusses the economics of manufacturing or processing in the Trust Territory. (Author)

**PB-205 823 PC A02/MF A01**

Kansas Water Resources Research Inst., Manhattan.

**A New Type of Disinfectant for Water Supplies**

Completion rept. Mar 69-Jun 71

Jack L. Lambert, and Louis R. Fina. Jun 71, 20p

Contrib-78, OWRR-A-028-KAN(2)

Contract DI-14-01-001-1635

Descriptors: \*Disinfectants, \*Water supplies, \*Iodides, Disinfectants, Water treatment, Water pollution, Contaminants, Viruses, Bacteria, Bacillus, Anion exchanging.

Triiodide combined with strong base anion exchange resins forms stable, nearly insoluble, complexes that have remarkable disinfecting capabilities. Complete kills are effected with water suspensions of virus (both DNA and RNA) Gram negative and Gram positive bacteria (whether capsulated or not), and viability of sporulating Bacilli species is reduced up to 99.9%. Water to be treated is simply passed through a column of the resin-complex. The bacteria or virus, shown by 14C or 3H tracers, pass through the column and are not filtered out. Kill is immediate and irreversible. No I2, I3(-), IO(-), IO3(-), and IO4(-) are detected when the cadmium iodide-linear starch reagent method was used. Iodide, the halide form, was found in amounts ranging from 0.2-0.5 PPM. This is well below the taste threshold and indeed may be considered beneficial in iodine deficient areas.

**PB-206 514 PC A05/MF A01**

Department of Housing and Urban Development, Washington, D.C. Office of International Affairs.

**Cooperative Housing, Ideas and Methods Exchange No. 52**

J. Robert Dodge. Jul 71, 76p

Descriptors: \*Urban planning, Residential buildings, Economic development, Classifying, Construction, Finance, Management planning, Income, Education, Organizations, Management.

Identifiers: \*Cooperative housing.

Because the cooperative movement as an economic and social phenomena has grown and proliferated to such an extent that it has assumed world-wide importance and because of the interest in cooperative housing in developing countries, the subject has been explored in greater depth and from a different point of view than in an earlier publication. Ideas gleaned from experiences in both industrialized and developing countries have been included as a guide to those interested in undertaking cooperative housing programs. (Author)

**PB-206 539 PC A20/MF A01**

Central Treaty Organization, Ankara, (Turkey).

**CENTO Symposium on Hydrology and Water Resources Development. Held in Ankara, Turkey, 7-12 February 1966**

Dec 66, 464p TA/OST-AN-66-2-1

Descriptors: \*Hydrology, \*Water resources, Economic development, Economic factors, Ground water, Surface waters, Developing countries, Meetings, Turkey.

Identifiers: \*Water resources development, CENTO.

The document presents the papers delivered at a symposium on hydrology and water resources development held in Ankara, Turkey, 2-12 February 1966. It is felt that the meeting marked a step forward in considering the extent and need to develop knowledge of a region's water resources as a vital foundation for economic development programs. The general topics covered include water resources development, surface hydrology, groundwater hydrology, and agricultural and industrial problems. (Author)

**PB-206 540 PC A11/MF A01**

State Univ. of New York, Albany. School of Library Science.

**Manual on Book and Library Activities in Developing Countries**

Stanley A. Barnett, and Roland R. Piggford. Jun 69, 243p TA/OST-AN-69-6-1

Contract AID/csd-2156

Descriptors: \*Books, \*Developing countries, \*Libraries, Developing countries, \*Economic development, Developing countries, Publishing, Printing, Manuals.

This guideline manual is intended to provide assistance to those interested in conceiving and framing sound and useful book activities for the enhancement of economic development. It is a compendium of ideas, techniques, and procedures regarding book and library activities that have been formulated and/or tested in developing countries during recent years. Specific areas of coverage include: The role of books in the national growth process; summaries of the major book needs in specific developing areas; summary of international book activities by government and private organizations; book subsidy programs and projects; library development activity and training; book and periodical procurement services; stimulating local book industries; regional book development or translation centers; textbook programs; building and strengthening book-related institutions; and financing book industry development.

**PB-206 541 PC A17/MF A01**

Central Treaty Organization, Ankara (Turkey).

**CENTO Conference on Engineering Education Held in Isfahan, Iran on November 7-13, 1966**

Nov 67, 389p TA/OST-AN-66-11-1

Descriptors: \*Engineering education, Meetings, \*Developing countries, Engineering education, Economic development, Engineering schools, Turkey, Iran.

The document is comprised of papers presented at a conference on engineering education. The purpose of the conference was to take cognizance of the fact that an adequate reservoir of well qualified engineers and technicians is basic to developed and developing industrial economies. Specific areas covered include: the need for engineers and technicians; present systems of engineering education; training of engineering technicians; undergraduate engineering curricula; teaching methods and aids; relations of engineering education with industries and government; professional programs related to a region's needs; graduate engineering education; role of research in engineering education; duties, qualifications and preparation of teachers.

**PB-206 549 PC A14/MF A01**

Kaiser Engineers, Oakland, Calif.

**A Manual on Water Desalination. Volume I. Technology**

Apr 67, 322p TA/OST-AN-67-4-1



# APPROPRIATE TECHNOLOGY ABSTRACTS

Contract AID/csd-1440  
See also Volume 2, PB-206 550.

Descriptors: \*Desalting, \*Reviews, Manuals, Distillation, Freezing, Electrodialysis, Osmosis, Evaporation, Electric power plants, Nuclear power plants, Materials recovery, Brines, Industrial plants, Industrial engineering, Chemical engineering, Water supply, Feasibility, Design criteria, Developing countries.

Identifiers: Electrodialysis desalination, Reverse osmosis desalination, Vercile tube evaporation, Multistage flash distillation, Vapor compression distillation, Solar distillation, Vacuum freeze vapor compression desalination.

The manual has been prepared as a guide in evaluating the feasibility of desalination in water-short areas where desalination may be competitive with other water sources. The manual is divided into two volumes, which may be used independently of each other. Volume I includes a discussion of the state of the art of the major desalination processes. Specific topics include: Saline water phenomena and definitions; state of the art of distillation, freezing and crystallization, electrodialysis, and reverse osmosis processes; description of typical plants; dual-purpose electric power generation-water desalination plants; recovery of chemicals as by-products; summary of major conceptual design studies.

**PB-206 550** PC A09/MF A01  
Kaiser Engineers, Oakland, Calif.  
**A Manual on Water Desalination. Volume II. Economics**  
Apr 67, 179p TA/OST-AN-67-4-2  
Contract AID/csd-1440  
See also Volume 1, PB-206 549.

Descriptors: \*Water supply, \*Desalting, \*Developing countries, Desalting, Water resources, Economic development, Feasibility, Questionnaires, Cost estimates, Sea water, Brackish water, Solubility, Capital costs, Operating costs, Site surveys.

The report provides guidelines for the initiation of a program for defining and solving the water shortage problems of a particular nation or region using desalination. Its scope includes the formulation of a logical and feasible water development plan; the accomplishment of preliminary feasibility studies on the possible solutions, and the determination of the most promising course of action based upon the results of these studies; and the accomplishment of a detailed engineering feasibility and economic study of the possible alternatives. A series of estimating aids and nomographs for determining capital costs of desalination plant facilities is included. (Author)

**PB-206 698** PC A03/MF A01  
General Electric Co., Schenectady, N.Y. General Engineering Lab.  
**Refrigeration-Cooling Systems for Rural Communities in Developing Countries**  
Dec 62, 45p TA/OST-AN-62-12-1  
Contract AID-REPAS-1

Descriptors: \*Developing countries, Food storage, \*Food storage, \*Refrigerating, Evaluation, Ice refrigeration, Controlled atmospheres, Steam jet refrigeration, Thermoelectric refrigeration, Transport refrigeration, Rural areas.

A review and evaluation is provided of alternative refrigeration-cooling systems for application in the rural areas of newly developing countries. The available equipment suited to the needs of these countries is identified, and development opportunities for improved equipment systems are delineated. The scope of the document is restricted to community or village sized facilities for fresh food preservation. A list of equipment manufacturers is included. (Author)

**PB-206 700** PC A08/MF A01  
Central Treaty Organization, Ankara (Turkey).  
**CENTO Conference on Industrial Vocational Education Held in Ramsar, Iran on June 23-30, 1968**  
Apr 69, 171p TA/OST-AN-69-4-1

Descriptors: \*Industrial training, \*Developing countries, Planning, Instructors, Counseling, Meetings, Turkey.  
Identifiers: \*Vocational education.

The report provides the texts of most of the papers presented at a conference on the problems of vocational industrial education. Some of the topics covered are: manpower planning and vocational education; elements of a coordinated national program; education and training patterns for developing manpower; developing effective programs for vocational education and training; structure and use of advisory committees on vocational education; programs for preparing teachers; occupational testing, guidance, counselling, and follow-up.

**PB-206 701** PC A22/MF A01  
Central Treaty Organization, Ankara (Turkey).  
**Seminar on Evaluation of Water Resources With Scarce Data, Held in Tehran, Iran on March 4-8, 1969**  
Final rept.  
Jan 70, 515p TA/OST-AN-70-1-2

Descriptors: \*Water resources, Evaluation, \*Hydrology, Developing countries, Meetings, Stream flow, Watersheds, Droughts, Water quality, Surface water runoff, Agriculture, Water supply, Water storage, Reservoirs, Iran.

The report is comprised of papers, originally presented at a seminar held 4-8 March 1969 in Tehran, Iran, which deal with the evaluation of water resources within the limitations imposed by this scarcity of data. Some of the topics covered are: Minimal data gathering procedures; Maximum utilization of scarce data in hydrological design; Preparation of long term flow sequence from short term records; Drought frequency analysis by means of synthetic flow sequences; Estimation of factors controlling streamflow in areas of limited data; Land treatment in agricultural watershed hydrology research. (Author)

**PB-206 728** PC A20/MF A01  
International Road Federation, Washington, D. C.  
**1971 World Survey of Current Research and Development on Roads and Road Transport. A Report Covering an Inventory of 63 Countries**  
Dec 71, 458p\*  
Contract FH-11-7656  
See also report dated Dec 70, PB-197 492.

Descriptors: \*Highway transportation, \*Foreign countries, \*Roads, Research, Bibliographies, Construction materials, Environmental engineering, Pavements, Soil properties, Safety, Tests, Traffic engineering, Skid resistance, Projects, Systems management, Structural design.  
Identifiers: Roadway edge markings.

Research and development studies in progress during CY 1971 or recently completed on roads and road transport are listed by country showing research agency, study title, and objective. The report includes a survey of research in 63 countries covering a total of 2,960 R and D projects. In addition to the survey, the document includes 3 papers printed in full—one on environmental aspects of highway location and design, one on rapid test methods, and one on lane edge delineation.

**PB-206 775** PC A12/MF A01  
Continental-Allied Co., Inc., Washington, D.C.  
**Five Industries for the Central African Republic**  
Erwin J. Sholton, and Edward A. Tenenbaum.  
Nov 65, 267p TA/OST-AN-65-11-1  
Contract AID/af-288

Descriptors: \*Developing countries, Industries, \*Economic development, Developing countries, Surveys, Profits, Investments, Demand(Economics), Capital, Marketing.  
Identifiers: \*Central Africa Republic.

Isolated by geography, lacking low-cost means of transportation, the Central Africa Republic earns comparatively little from her exports, and pays heavily for her imports. It is considered imperative that the C.A.R. reorient her economy towards manufacture of goods for her own market. A survey was made of private investment opportunities in in-

dustry and commerce in the C.A.R. Five possible new industries - storage batteries, asbestos cement, starch, reconstituted mild and ice cream, and tomato puree - were selected on the basis of this survey and studied in detail. In each case, it was found that the industry can operate to serve C.A.R.'s internal market, to reduce present prices, and to earn a profit of at least 25% per annum. (Author)

**PB-206 776** PC A08/MF A01  
Central Treaty Organization, Ankara(Turkey).  
**CENTO Travelling Seminar on Farm Tools and Implements**  
Sep 68, 154p TA/OST-AN-68-9-1

Descriptors: \*Agricultural machinery, Surveys, \*Developing countries, Agricultural machinery, Handbooks, Pakistan, Iran, Turkey.

A survey was carried out in Pakistan, Iran, and Turkey to help determine what could be done to provide farmers of these countries with better farm tools and more power to help them increase farm production. Major emphasis was laid on the collection of information on tools and implements in current use. In addition, consideration was given to a number of tools and attachments which it was felt should be of wider use than at present. This report was prepared as a result of the survey. It is in the form of a handbook for use by agricultural technicians, extension workers, farmers, students, and producers of farm machinery as an aid in their work to promote practical, useable ideas which apply to their areas. (Author)

**PB-206 798** PC A10/MF A01  
General Electric Co., Schenectady, N.Y. General Engineering Lab.  
**Preliminary Report of Field Survey Teams on the Generation and Utilization of Power in Rural Areas of Developing Countries**  
Sep 62, 211p TA/OST-AN-62-9-1  
Contract AID-REPAS-1  
See also PB-206 800 and PB-206 801.

Descriptors: \*Electrification, \*Rural areas, \*Developing countries, Electrification, India, Colombia, Chile, Peru, Surveys, Electric power generation, Utilization, Economic analysis.

The report presents the principal impressions and tentative conclusions of field investigations on the generation and utilization of electric power in rural areas which were conducted in India, Chile, Colombia, and Peru. The first part of the report provides a general review of existing rural electrification programs in India and Colombia. The remaining portions contain the observations of the field survey teams on the significance of small scale power units from the standpoint of village development programs.

**PB-206 799** PC A06/MF A01  
Michigan Univ., Ann Arbor. Architectural Research Lab.  
**A Preliminary Investigation of the Potential use of Foam Plastics for Housing in Underdeveloped Areas**  
Rept. dated Jul 62-Feb 63  
Stephen C. A. Paraskevopoulos, Harold J. Borkin, Robert M. Darvas, and C. Theodore Larson. Feb 63, 102p TA/OST-AN-63-2-1

Descriptors: \*Houses, \*Cellular plastics, \*Developing countries, Houses, Structural plastics, Structural engineering, Structural design, Mechanical properties, Production methods, Construction, Laminated plastics.

The report describes a study of the feasibility of using plastics, particularly foam plastics, for low-cost housing in developing countries. The advantages of foam plastics are reviewed, as are the important physical properties, present structural applications, and potential uses in housing of the materials. The mechanical properties of foam plastics are discussed from the point of view of structural engineering, production methods, and erection techniques. A number of promising structures are illustrated. (Author)



**PB-206 800** PC A06/MF A01  
General Electric Co., Schenectady, N.Y. Advanced Technology Labs.  
**Small-Scale Power Supplies for Rural Communities in Developing Countries**  
Mar 63, 120p TA/OST-AN-63-3-1  
Contract AID-REPAS-1  
See also PB-206 798 and PB-206 801.

Descriptors: \*Electric power generation, \*Rural areas, \*Developing countries, Electric power generation, Electric power plants, Electric generators, Economic analysis, Utilization.

The report describes and evaluates alternative small-scale technologies for supplying electric energy to rural communities in developing countries. It appraises the technical suitability of currently available small-scale power supplies, and delineates near-term and far-term development opportunities for improved equipment systems. The technologies considered include: Internal combustion engine generators; small scale hydro-electric plants; thermal vapor engine generators; gas turbine generators; wind generators, photovoltaic solar cells; thermoelectric generators; and fuel cells.

**PB-206 801** PC A03/MF A01  
General Electric Co. Schenectady, N.Y. Advanced Technology Labs.  
**Generation and Utilization of Power for Rural Communities in Developing Countries**  
Summary rept.  
May 63, 39p TA/OST-AN-63-5-1  
Contract AID-REPAS-1  
See also PB-206 798 and PB-206 800.

Descriptors: \*Electrification, \*Rural areas, \*Developing countries, Electrification, \*Electric power generation, Developing countries, Electric generators, Electric power plants, Utilization, Economic analysis.

The principal objective of the project was to assess the need for and significance of electric power for the development of rural communities, with particular attention to the utility and feasibility of small scale power supplies as a means of providing power to village communities. The specific areas of concern included: Small-and intermediate-scale generating plants and grid connections for rural communities; utilization of electric power in rural communities for irrigation, rural industry, and illumination; technical appraisal of potential small-scale power sources, refrigeration-cooling systems, and water treatment processes; and technical support for rural development. (Author)

**PB-206 802** PC A04/MF A01  
Forest Service, Washington, D.C.  
**Report on Survey Team Projected AID Research Program on Improved Forest Products Utilization in Latin America**  
Alan D. Freas, B. Francis Kukachka, and Eugene F. Landt. Aug 65, 62p TA/OSTAN-65-8-1

Descriptors: \*Wood products, Utilization, \*South America, Wood products, Economic development, Research projects, Wood pulp, Surveys, Inventories, Quality, Tests, Peru, Brazil, Colombia, Venezuela, Ecuador.

South America has the largest single forested area in the world, most of it inaccessible and remote from population centers and, hence, unused to a great extent. Most of the forest consists of heterogeneous stands with many species that so far have not found their way into the world market or into local utilization. This report presents recommendations for a group of research projects to improve the economic use made of Amazonian and other forest areas of Peru, Brazil, Colombia, Venezuela, and Ecuador. The general nature of the projects are as follows: Research on little known timber species of Latin American in relation to their utilization locally and abroad; studies on the preparation of high yield pulps; and forest products utilization and marketing in Venezuela. (Author)

**PB-206 803** PC A10/MF A01  
Robinson (C. W.) and Co., Inc., New York.

**Cooperative Effort in Industrial Development**  
Final rept. 1962-1966.  
Dec 66, 203p TA/OST-AN-66-12-1  
Contract AID/nesa-28

Descriptors: \*Nepal, \*Industries, \*Economic development, \*Developing countries, Reviews, Project planning, Investments, Banking business, Financial management.

The Nepal Industrial Development Corporation (NIDC) has the responsibility of coordinating the Nepalese Government's program to mobilize private capital in sound and profitable industrial enterprises. This report summarizes selected activities and achievements that have been of particular significance in the success of the NIDC during the period from July 1962 to December 1966. Among the topics discussed are: Management of NIDC; banking activities; meeting special problems of bank clients; investment promotion; development of human resources; pre-investment studies; industrial districts. (Author)

**PB-206 804** PC A13/MF A01  
Central Treaty Organization, Ankara, (Turkey).  
**CENTO Conference on Agricultural Extension, Held in Ankara-Denizli-Izmir, Turkey, 12-22 April 1967**  
Oct 67, 286p TA/OST-AN-67-10-1

Descriptors: \*Education, Developing countries, \*Agriculture, Economic development, Meetings, Agricultural machinery, Marketing, Livestock, Fertilizers, Iran, Pakistan, Turkey.  
Identifiers: \*Agricultural extension work.

Agricultural extension is an educational processes. It brings to agricultural communities the knowledge and skills developed by research institutions, and by making these known it seeks to improve the level of agricultural production. This report is comprised of papers presented at a symposium, held in Ankara, Denizli, and Izmir, Turkey, 12-22 April 1967, which was called to provide an opportunity for extension service officials to review practical approaches to successful extension work at the farmer level. (Author)

**PB-206 805** PC A13/MF A01  
Mississippi State Univ., State College. Seed Technology Lab.  
**Seed Processing and Handling**  
Charles E. Vaughan, Bill R. Gregg, and James C. DE Louche. Jan 68, 296p Handbook-1, TA/OST-AN-68-1-1  
Contract AID/W-607

Descriptors: \*Seeds, \*Processing, Handling equipment, Developing countries, Handbooks.  
Identifiers: \*Seed processing.

Seeds are processed to remove contaminants, to size-grade for plantability, to remove damaged or deteriorated seed, and to apply seed treatment materials. This handbook was prepared as an introduction to seed processing and handling. Various types of equipment are considered. The main features and component parts, principles of separation, uses, and operational procedures are discussed for each machine. Emphasis is placed on the concept of the 'processing line', that is, the combination, proper sequence and arrangement of machines, conveyors, and procedures required for handling and processing seeds. (Author)

**PB-206 806** PC A04/MF A01  
International Rice Research Inst., Los Banos, Laguna, (Philippines).  
**Performance and Economics of Use of Small Equipment in Tropical Monsoon Countries: The Case of the Philippines**  
Stanley S. Johnson. Apr 68, 52p TA/OST-AN-68-4-1

Descriptors: \*Agricultural machinery, \*Philippines, Economic development, Developing countries, Monsoons, Performance.

Mechanized agriculture is being introduced in the countries of Southeast Asia with varying degrees of success and acceptance. This paper discusses the status of mechanization in one of those countries,

the Philippines. It provides the background in which this mechanization is proceeding, and then discusses the types of equipment that are being introduced. The performance data of these machines under Philippine conditions, and the economics of their use, are also presented. (Author)

**PB-206 851** PC A05/MF A01  
Organization for Social and Technical Innovation, Inc., Cambridge, Mass.  
**Industrialized Housing. The Opportunity and the Problems in Developing Areas, Ideas and Methods Exchange No. 66**  
Ian Donald Turner, and John F. C. Turner. Jan 72, 80p  
Sponsored in part by the Department of Housing and Urban Development, Washington, D.C.

Descriptors: \*Residential buildings, \*Mass production, \*Developing countries, Residential buildings, Reviews, Building, Industries, Automation, Construction, Prefabrication, Feasibility, Errors, Standards, Mass production, Manufacturing, Expenses, Asia, Africa, South America.  
Identifiers: \*Industrialized housing.

The problem of providing suitable shelter in the world's less developed nations is one of critical urgency. While this problem grows more and more acute, the industrialized nations of North America and Europe are struggling to meet their own housing needs through an increasingly advanced technology. It is a natural consequence of this process for housing manufacturers, technicians and public officials to seek possible applications of this advanced technology in less developed countries. In recent years, HUD's Office of International Affairs has increasingly been called upon to advise domestic housing producers and, through AID, foreign governments and developers on the appropriateness of industrialized techniques abroad. It has attempted to correct widely held misconceptions, while witnessing the costly failures of many attempts to develop criteria to assess the value of existing industrialized systems abroad, and at the same time to assist in the design of new systems created specifically for that market. (Author)

**PB-206 902** PC A04/MF A01  
Agency for International Development, Washington, D.C.  
**Industrializing at the Grass Roots Level in the Philippines**  
Rept. for 1959-1963  
Kenneth P. Sheldon. 1963, 63p TA/OST-AN-63-13-1

Descriptors: \*Developing countries, Industries, \*Economic development, Developing countries, \*Philippines, Economic development, Surveys, Natural resources, Agriculture.  
Identifiers: Tarlac(Philippines).

The establishment of a first industry in an underdeveloped region stimulates others into being; a small beginning is enough to set up a chain reaction. This principle has been demonstrated time and again in the Philippines and in other developing countries. The document shows how this start was made in the highly agricultural provinces in the Philippines and the proper way for it to develop. In addition to a general discussion of principles and procedures, the document contains, for the purpose of providing a concrete example, a detailed report of a survey made of a single Philippine province (Tarlac) to obtain practical information concerning its resources, natural advantages, and the desires of its people regarding industrialization. (Author)

**PB-206 904** PC A11/MF A01  
Stanford Research Inst., Menlo Park, Calif.  
**An Industrial Park Development Program for Central America**  
Keith E. Duke, Phillip L. Adams, and Robert W. Davenport. Nov 64, 234p TA/OST-AN-64-11-2

Descriptors: \*Central America, \*Industries, \*Economic development, \*Developing countries, Feasibility, Project planning, Industrial plants, Parks, Roads, Site surveys, Plant location, Financial management.



Identifiers: Industrial parks, Industrial development.

The development of a number of industrial parks in Central America could be an important means of stimulating industrial growth and promoting industrial development in this region. This document provides the results of a study undertaken to determine the desirability and feasibility of establishing such industrial parks, and to define the nature, scope, and costs of an industrial parks program. The topics covered include the purposes and characteristics of industrial parks in Central America, the physical infrastructure and its general influence on industrial growth and location of industrial parks in the region, specific proposed locations for industrial park sites, and financial and organizational resources for an industrial parks program. (Author)

**PB-206 905** PC A02/MF A01  
Agency for International Development, Washington, D.C. Office of Science and Technology.  
**Economic Damage Caused by Aquatic Weeds. (Preliminary Survey)**  
Dec 71, 18p Rept no. TA/OST-71-5

Descriptors: \*Economic analysis, \*Aquatic weeds, Developing countries, Rivers, Streams, Navigable canals, Reservoirs, Lakes, Harbors, Classifying, Distribution(Property), Damage.

The report attempts to estimate in a very preliminary way the economic significance of the aquatic weed problem in developing countries. It is limited to the problems of weed infestation in rivers, streams, canals, reservoirs, ponds, lakes, harbors, and similar bodies of water. Topics covered are: types and distribution of aquatic weeds; types of damage; economic impact; and country specific situations. A bibliography is included. (Author)

**PB-206 913** PC A04/MF A01  
Colorado State Univ., Fort Collins.  
**Project Colorado. Feasibility Studies. Preliminary Designs**  
Harry F. Troxell, and Carlos E. De Sa. 1964, 61p TA/OST-AN-64-13-1  
Prepared in cooperation with Bahia Univ., Salvador (Brazil).

Descriptors: \*Economic development, \*Developing countries, \*Industries, \*Brazil, Industrial mobilization, Feasibility, Food industry, Ceramics.  
Identifiers: Colorado project, Ceramics industry.

Project Colorado is a program of cooperation for industrial development in the State of Bahia, Brazil. The objectives, to develop new small, rural industries and to train business and engineering leaders, are accomplished by utilizing faculty and students from the University of Bahia and Colorado State University. The industrial development activities are based on a thorough analysis of the advantages and opportunities the region has to offer. Feasibility studies, followed by preliminary designs, were made for the following industries: Poultry and egg; ceramic products; peanut oil extraction; slaughterhouse for cattle and hogs; mandioca processing; and fruit processing. The document contains detailed reports of each of these industrial prospects by the personnel who contributed to the general evaluation, the marketing data, and the production requirements.

**PB-206 967** PC A03/MF A01  
Small Business Administration, Washington, D.C.  
**Report on Small Industry Programs in Turkey**  
Ross D. Davis. 15 Feb 65, 41p TA/OST-AN-65-2-2

Descriptors: \*Turkey, \*Industries, \*Economic development, \*Developing countries, Planning, International trade, Evaluation.  
Identifiers: Small industry.

The report sets out observations based on a visit to Turkey made in January 1965 by the Executive Administrator of the U. S. Small Business Administration. The purpose of the visit was to evaluate certain plans of the Government of Turkey designed to modernize small-scale industry, to promote its integration into a balanced pattern of industrial development, and to create in small industries

try a significant capacity for import substitution and export activities. The topics covered in the report include: Role of small industry in Turkey; planning for small industry; current activities to support small industry; some useful principles to guide the development and operation of small industry programs; comments on the small industry programs in Turkey; an agency for small industry programs. (Author)

**PB-206 968** PC A03/MF A01  
Checchi and Co., Washington, D.C.  
**Central African Industrial Coordination Survey**  
Robert Manly. Jul 65, 45p TA/OST-AN-65-7-2  
Contract AID/afr-292

Descriptors: \*Developing countries, \*Industries, \*Economic development, Developing countries, Developing countries, Metals, Electric equipment, Tools, Machinery, Vehicles, Africa.  
Identifiers: \*Cameroun, \*Central African Republic, \*Chad, \*Congo, \*Zaire, \*Gabon.

The report presents the findings and conclusions of an Industrial Coordination Survey of the Central African sub-region of Cameroun, Central African Republic, Chad, Congo, Democratic Republic of the Congo (Zaire), and Gabon. The principle objective of the study, which was done in association with the Economic Commission for Africa, was to investigate the possibilities for sub-regional harmonization of industrial development. A list of industries that appear to have a market potential in the sub-region was developed, and certain specific industries were considered in detail with respect to coordination. The report also contains a section dealing with entrepreneurship and the encouragement of industrial growth in the sub-region. (Author)

**PB-206 969** PC A13/MF A01  
Michigan Univ., Ann Arbor. Architectural Research Lab.  
**Architectural Research on Structural Potential of Foam Plastics for Housing in Underdeveloped Areas**  
Research rept. 1962-1965  
Stephen C. A. Paraskevopoulos, Harold J. Borkin, J. Sterling Crandall, James L. Haecker, and Willard A. Oberdick. Nov 65, 295p TA/OST-AN-65-11-2

Descriptors: \*Houses, \*Cellular plastics, \*Developing countries, Houses, Structural plastics, Structural engineering, Marketing, Plastics industry, Structural forms, Structural analysis, Construction, Laminated plastics.

A feasibility study, reported in PB-206 799, established the desirability of investigating the use of foam plastics as structural materials, in the belief that such a development could contribute towards a resolution of housing problems throughout the world. This report describes a research program aimed at exploring the structural potential of these materials for housing in underdeveloped areas. A review is provided of plastics from the standpoint of physical properties, raw materials resources, production, and marketing. A detailed description is given of a structural investigation of foam plastics, and a number of demonstration structures are analytically described. (Author)

**PB-206 970** PC A04/MF A01  
Battelle Memorial Inst., Columbus, Ohio. Columbus Labs.  
**Prefeasibility Study of an Expanded Leather and Shoe Industry in West Africa to 1980**  
Research rept.  
Konrad Biedermann. 29 Jul 66, 57p TA/OST-AN-66-7-1

Descriptors: \*Economic development, \*Developing countries, \*Industries, \*Africa, Leather, Shoes, Industrial mobilizing.  
Identifiers: \*Leather industry, \*Shoe industry.

Cooperative economic-development planning on a basis that includes the entire West African sub-region promises to result in an industrial development pattern that might contribute to a more effective and economic utilization of African resources and to improvement in living standards. This re-

quires, however, obtaining an overview of what a feasible industrialization pattern for specific industries within the sub-region might be over a period of 10 to 15 years. An attempt is made, in the report, to answer some of the basic questions along these lines for the leather and shoe industry in West Africa. Consideration is given to West African markets for leather and shoes, current production capabilities, feasible expansion of leather and shoe production to 1980, and the potential importance to economic development of West Africa.

**PB-206 971** PC A03/MF A01  
Battelle Memorial Inst., Columbus, Ohio. Columbus Labs.  
**Prefeasibility Study of an Expanded Paint Products Industry in West Africa to 1980**  
Research rept.  
Harry W. Barr, Jr. 29 Jul 66, 41p TA/OST-AN-66-7-2

Descriptors: \*Economic development, \*Developing countries, \*Industries, \*Africa, Paints, Industrial mobilizing.  
Identifiers: \*Paint industry.

A study was undertaken to gain an approximation of what a feasible industrialization pattern for the paint products industry in the West African sub-region would appear to be in the period up to 1980. The report provides the results of the study. Consideration is given to current markets for paint products, projected markets to 1980, Local production of raw materials and paint products, and potential importance to the economic development of West Africa.

**PB-206 972** PC E01/MF A01  
Miner (Thomas H.) and Associates, Inc., Chicago, Ill.  
**Pre-Investment Study. Meat Packing Industry for Entente Guaranty Fund**  
Nov 67, 177 TA/OST-AN-67-11-1  
Contract AID/afr-496

Descriptors: \*Food industry, \*Meats, \*Africa, Food industry, \*Livestock, Food industry, Economic analysis, Economic development, Market research, Developing countries, Investments, United States.  
Identifiers: \*Meat packing industry.

Livestock are among the principal resources of the West African Savanna zone, and surplus livestock have, for centuries, supplied some of the consumption needs of the populous Coastal cities many hundreds of miles to the south. It is believed that this traditional livestock trade can be rationalized principally by more slaughterhouses in the producing zone, and subsequent shipment of meat to the consuming areas. This procedure would tend to add more value to the products of the stock raising countries, while providing better and cheaper meat to consumers. Accordingly, an economic and technical analysis was undertaken aimed at inducing U. S. private investment in the livestock industry in Niger and Upper Volta to serve markets in Ivory Coast, Togo, Dahomey, Ghana, Nigeria, and other appropriate markets. Consideration was given to availability of livestock in Niger and Upper Volta, and type of existing potential consumer markets.

**PB-206 976** PC E01/MF A01  
Michigan Univ., Ann Arbor. Architectural Research Lab.  
**Factors Governing the Introduction of Foam Plastics for Housing Use in Underdeveloped Areas of the World**  
Stephen C. A. Paraskevopoulos, Harold J. Borkin, J. Sterling Crandall, C. Theodore Larson, and Willard A. Oberdick. Jun 66, 65 TA/OST-AN-66-6-1

Descriptors: \*Houses, \*Cellular plastics, \*Developing countries, Houses, Laminated plastics, Structural plastics, Structural engineering, Structural design, Construction, Roofs, Sheathing, Buildings.

The technical and economic feasibility of using foam plastics in housing in underdeveloped areas of the world has been established, as described in



previous reports in this series. This document represents a follow-up intended to advise AID specifically on the introduction of foam plastics for housing use abroad and to report on progress of an ongoing testing program. Paper-laminated foam board gives every indication that it is a building material suitable for many different applications, and possible uses of this material in inexpensive roofing systems are described and illustrated. (Author)

**PB-206 977** **PC A06/MF A01**  
Auburn Univ., Ala. International Center for Aquacultures.  
**Fishculture Survey Report For West Central Africa. Increasing Fish Production by Improved Fishcultures**  
D. D. Moss, G. B. Pardue, and M. J. Danner. 30 Jun 69, 125p TA/OST-AN-69-6-3

Descriptors: \*Aquaculture, Surveys, \*Economic development, \*Africa, Fisheries, Developing countries, Marketing, Research projects, Food processing, Drying, Shrimps, Shellfish, Fresh water fishes, Marine fishes.  
Identifiers: Cameroon, Central African Republic, Ghana, Ivory Coast, Nigeria, Senegal, Togo.

Intensive fishculture is an effective means of producing protein of high quality. In view of this, a survey was made of the status and needs of fishculture activities in the following West Central African nations: Cameroon, Central African Republic, Ghana, Ivory Coast, Nigeria, Senegal, and Togo. Attention was given to existing programs being carried out in inland fisheries, with emphasis on fishculture projects, and to the marketing and economics of the fisheries in each country. (Author)

**PB-207 132** **PC A03/MF A01**  
Maynard (H. B.) and Co., Inc., Pittsburgh, Pa.  
**Feasibility of Ipecac Extraction Plant**  
Final rept.  
Eugene H. Payne. Apr 66, 45p TA/OST-AN-66-4-1  
Contract AID/csd-239, PIO/T-511-049-3-20346

Descriptors: \*edicinal plants, Drug industry, \*Drug industry, Industrial plants, \*Developing countries, Drug industry, Drugs, Plants(Botany), Alkaloids, Extraction, Economic development.  
Identifiers: Cephaelis ipecacuanha, \*Ipecac, \*Bolivia.

'Brazilian' ipecac is the rhizome and root portions of the low growing vine Cephaelis (Uragoga) ipecacuanha. It is the source of emetine and several other alkaloids. The report presents the results of a study undertaken to determine the feasibility of establishing facilities to distill ipecac in Bolivia. It was found that such a facility would be economically sound only under one or both of two conditions: (1) that the cultivation of this source plant be encouraged; and (2) that it be operated in conjunction with the extraction of other products, such as cocillana, achiote, and cinchona.

**PB-207 192** **PC A04/MF A01**  
Geological Survey, Washington, D.C.  
**Techniques for Assessing Water Resources Potentials in the Developing Countries, with Emphasis on Streamflow, Erosion and Sediment Transport, Water Movement in Unsaturated Soils, Ground Water, and Remote Sensing in Hydrologic Applications**  
Preliminary rept.  
George C. Taylor, Jr. Dec 71, 73p  
Grant PASA-TA(IC)-9-72

Descriptors: \*Water resources, Developing countries, \*Hydrology, Research, Stream flow, Soil erosion, Sediment transport, Ground water, Remote sensing, Probes, Soil water.

The preliminary report describes techniques for assessing water-resource potentials in the developing countries, most of which lie in the tropics. Techniques or methodology for measuring or evaluating hydrologic parameters are described in the categories of streamflow, erosion and sedimentation, water movement in unsaturated soils, ground water and remote sensing in hydrologic applications. Selected bibliographies of each of these categories are included. (Author)

**PB-207 385** **PC A07/MF A01**  
Inter-American Geodetic Survey, Fort Clayton. Canal Zone. Natural Resources Div.  
**Natural Resources-Cadastral Inventory. Nicaraguan Pilot Project**  
Report for 1965-1966.  
Mar 66, 126p TA/OST-AN-66-3-I

Descriptors: \*Land surveys, \*Nicaragua, \*Developing Countries, Natural resources, Geology, Geomorphology, Climatology, Hydrology, Soils, Land use, Land titles, Developing countries.  
Identifiers: Cadastral surveys.

In preparation for a comprehensive cadastral and natural resources survey of Nicaragua, a pilot survey was undertaken in an agricultural area in the vicinity of Leon. The primary purpose was to provide orientation for those Nicaraguan specialists expected to occupy leading roles in the planning and execution of the comprehensive survey. This report presents a description of the geology, geomorphology, climatology, hydrology, soils, land use, and cadastral aspects of the region as determined by the survey. (Author)

**PB-207 393** **PC A05/MF A01**  
National Association of State Universities and Land Grant Colleges, Washington, D.C.  
**The Institutional Development Agreement. A New Operational Framework for A.I.D. and the Universities**  
Jan 70, 96p TA/OST-AN-70-1-3

Descriptors: \*Grants, \*Universities, \*Economic development, \*Developing countries, Projects, Agreements.  
Identifiers: Technical assistance, Agency for International Development.

This is the report of a joint committee of the National Association of State Universities and Land Grant Colleges (NASULGD) and the Agency for International Development (A.I.D.). The committee was asked to consider and recommend measures to improve operating arrangements between A.I.D. and the universities, including possible arrangements for experimental types of A.I.D. grants to universities for overseas technical assistance projects. The committee paid special attention to a type of development activity for which American colleges and universities are especially well suited -- the multi-year technical assistance project designed to aid in the establishment or improvement of educational and research institutions in less developed countries.

**PB-207 399** **PC A17/MF A01**  
Soil and Pavement Consultants of Southeast Asia, Oakland, Calif.  
**Engineering Study of Laterite and Lateritic Soils in Connection with Construction of Roads, Highways, and Airfields. Phase I. Southeast Asia (Thailand)**  
Final rept.  
B. A. Vallerger, J. A. Shuster, A. L. Love, and C. J. Van Til. Jun 69, 382p TA/OST-AN-69-6-4  
Contract AID/csd-1810

Descriptors: \*Soil properties, \*Southeast Asia, \*Roads, Construction, Landing fields, Classifications, Soil stabilization, Flexible pavements, Performance, Geomorphology, Structural design, Specifications, Durability, Foundations, Thailand.  
Identifiers: \*Lateritic soils.

There are a number of soils, principally those referred to as laterites and lateritic soils, which are found in southeast Asia and other tropical environments, but are essentially unknown in countries of the temperate zones. This document provides the results of field studies carried out in Thailand on lateritic soils. Included are reports on background studies of the literature and of geology, the development of a classification system for the soils pavement evaluation studies, and special studies on durability, stabilization, and dynamic properties. (Author)

**PB-207 400** **PC A04/MF A01**  
National Science Foundation, New Delhi (India). Science Liaison Staff.

**Science Education Improvement Project**  
1970, 71p TA/OST-AN-70-13-1

Descriptors: \*Education, \*India, \*Developing countries, Education, Programmed instruction, Developing countries, Research, Schools, Project planning, Improvement, Classifications.  
Identifiers: Science education, \*Curriculum development.

The report covers the activities of the Indian Science Education Improvement Project during the calendar year 1970. The major emphasis is on curriculum development activities. Topics covered include elementary and secondary school science programs, travelling science workshop, college science improvement program, special college/university programs, technical education, binational conferences, teaching aids, and participant training.

**PB-207 491** **PC A17/MF A01**  
Volunteers for International Technical Assistance, Inc., Schenectady, N.Y.  
**Village Technology Handbook**  
May 70, 382p TA/OST-AN-70-5-1

Descriptors: \*Community development, Rural areas, \*Developing countries, Handbooks, Economic development, Crafts, Water resources, Sanitary engineering, Irrigation, Roads, Construction materials, Food, Snails, Washing, Heating.  
Identifiers: Village technology.

Village development takes on special importance in the light of the fact that 80% of those who live in less developed countries live in villages. This handbook is aimed at helping villagers to master the resources available to them. The general topics covered include water transport; storage, and purification, latrines, bilharziasis control, irrigation and road-building, poultry raising, silage, storing food at home, storing vegetables and fruit for winter use, how to salt fish, concrete construction, bamboo construction, glues, solar water heater, washing machines, cookers and stoves, home soap making, and bedding.

**PB-207 495** **PC A17/MF A01**  
Agency for International Development, Washington, D.C. Office of Science and Technology.  
**Science, Technology, and Development. Volume I. Natural Resources. Energy, Water, River Basin Development**  
1962, 381p TA/OST-AN-62-13-1  
See also Volume 3, PB-207 496.

Descriptors: \*Economic development, \*Developing countries, \*Natural resources, Developing countries, Electric power, Cooperation, Rural areas, Coal mining, Fuels, Crude oil, Refineries, Water supply, River basin development, Energy, Reviews, Meetings.

The document is volume one of a twelve volume series containing papers of U.S. origin which were submitted at a conference on the Application of Science and Technology for the Benefit of Less Developed Areas, held in Geneva in 1963. It includes the following papers: Electrical distribution grid design and construction for rural areas, The REA program and the role of rural electric cooperative, TVA's experience with a power utilization program for rural areas, Some problems in initiating power supply in less developed areas, Rural electrification and rural development, Typical problems in the development of modern power supply in less developed areas, Practical application of coal mining technology, Metallurgical, domestic, and industrial utilization of low-rank coals; Auxiliary injected blast furnace fuels, Financing oil expansion, Economics and design of smaller petroleum refineries.

**PB-207 496** **PC A12/MF A01**  
Agency for International Development, Washington, D.C. Office of Science and Technology.  
**Science, Technology, and Development. Volume III. Agriculture**  
1962, 273p TA-OST-62-13-3  
See also Volume 4, PB-207 497.



# APPROPRIATE TECHNOLOGY ABSTRACTS

Descriptors: \*Economic development, Developing countries, \*Agriculture, Developing countries, Reviews, Labor relations, Farms, Management planning, Food habits, Nutrition, Meetings, Dietetics, Fisheries, Irrigation, Soil science, Plant genetics, Plant diseases, Pest control.

The document on agriculture is Volume 3 of a twelve volume series on science and technology in developing countries. It includes the following papers: Organizing for Agricultural Development; Tenure of farms; Motivation, productivity, and efficient use of labor, land and capital; Agricultural - Industrial Development, Effective Communication, Improving management in agricultural development, Meeting human needs through agricultural and food practices, Changing dietary and health practices, International cooperation in nutrition, research and planning; The evolution of soil science, Irrigation as a modern science, Plant genetics in increasing food production, Understanding and Control of Plant Diseases, and Protection from Insect and Vertebrate Pests.

**PB-207 497** **PC A09/MF A01**  
Agency for International Development, Washington, D.C. Office of Science and Technology.  
**Science, Technology, and Development. Volume IV. Industrial Development**  
1962, 199p TA/OST-AN-62-13-4  
See also Volume 5, PB-207 498.

Descriptors: \*Economic development, \*Developing countries, \*Industries, Developing Countries, Reviews, Policies, Financing, Marketing, Research, Iron and steel industry, Food processing, Wood products, Computer programming, Sociometrics, River basin development.  
Identifiers: Technology.

Volume 4 of a twelve volume series on science and technology in developing countries includes the following papers: Policy considerations in expanding industrial development, Creating a practical industrial development program, Adequate capital for industrialization; Planning Management in Industrializing Countries, Small and medium industry in development, Markets as a basis for industrial development; Integrated river-basin development and industrialization; The research institute as a key industrial development instrument, the Computer and High-Speed Information Processing industrial development; The iron and steel industry in a developing economy, Food processing and the developing society, and the forest products industry in economic development.

**PB-207 500** **PC A05/MF A01**  
Agency for International Development, Washington, D.C. Office of Science and Technology.  
**Science, Technology, AND Development. Volume VII. Social Problems of Development and Urbanization**  
1962, 99p TA/OST-AN-62-13-7  
See also Volume 8, PB-207 501.

Descriptors: \*Urbanization, Developing Countries, \*Economic development, Developing Countries, \*Developing countries, \*Social change, Culture(Social sciences), Social change, Sociometrics, Social change, Rural areas, Municipalities, Regional planning, Political systems, Community development, Residential buildings, Facilities, Reviews.  
Identifiers: Technology.

Volume 7 of a twelve volume series on science and technology in developing countries includes the following papers: Patterns of worldwide cultural change in the 1960's, Social stratification and social mobility in the development process, A theory of community development, The role of the family in industrialization, Adjusting rural people to an urban environment, Implications of urbanization for villages and rural sectors, Planning and development in metropolitan areas, Housing and community facilities in human development, Capital requirements for urban social overhead, and The political implications of urbanization and the development process.

**PB-207 507** **PC A17/MF A01**  
Basin Electric Power Cooperative, Bismarck, N. Dak.  
**Rural Housing Manual**  
William A. Schott. Mar 71, 378p\*  
Sponsored in part by the Department of Housing and Urban Development, Washington, D.C.

Descriptors: \*Residential buildings, \*Rural areas, \*Regional planning, \*Manuals, Community development, Surveys, Project planning, Financing, Co-operation, Legislation, Land use, Classifications, Management planning.  
Identifiers: Housing cooperatives.

The key to success in a housing program lies in the ability and desire of the local rural leadership to attain good low-cost housing. To accomplish this goal, personnel must be adequately informed and trained. It is intended that this training manual, along with technical assistance will provide rural electric cooperatives with the information they need.

**PB-207 520** **PC A18/MF A01**  
California Univ., Berkeley. Inst. of Transportation and Traffic Engineering.  
**Opportunities for Cost Reduction in the Design of Transport Facilities for Developing Regions**  
1970, 403p TA/OST-AN-70-12-2  
Contract DOT-OS-A9-004

Descriptors: \*Transportation, \*Developing countries, \*Cost engineering, Transportation, Roads, Design standards, Cost analysis, Construction, Savings, Air transportation, Waterway transportation, Ground vehicles, Economic models.

The document provides the results of an examination of traditional designs of transport facilities in the developing countries with a view to reducing total initial and/or operating costs, or to reducing costs devoted to the imported elements. The topics include: road cost analysis and design standards; road construction cost model; a road maintenance cost model; opportunities for cost savings in highway engineering design; economics of one-way bridging; potential cost savings in the design of water crossings; potential cost savings in the design and use of ground vehicles; opportunities for cost reductions in aircraft, airways, and airports; potential cost-savings in the selection of waterway and harbor techniques; harbors and associated facilities; economic models for choice of transport techniques in developing countries; tradeoffs between construction costs and maintenance costs.

**PB-207 534** **PC A04/MF A01**  
Council for International Progress in Management (USA), Inc., New York.  
**Report of Management Training Specialists Team, Brazil**  
Rept. for 31 Aug-12 Dec 64  
Robert C. Dietrick, Louis C. McNally, and James W. Quigg. Dec 64, 57p TA/OST-AN-64-12-2  
Contract PIO/T-512-40297

Descriptors: \*Industrial management, \*Management training, \*Brazil, Economic development, Developing countries, Brazil, Project planning, Organization theory.

The document summarizes the activities of a management training team which was assigned the responsibility of working with trainers of managers in 15 Productivity Centers in Brazil, of demonstrating improved techniques at the local plant level, of giving consultation and advice to productivity institutions on organization and activities programs, and of giving assistance to other management development institutions in Brazil. The program at each Center consisted of round-table discussions, plant visits, case study solutions, and the use of all other modern techniques to develop a local nucleus of management experts for the expansion and multiplication of Brazilian institutional self-help efforts.

**PB-207 613** **PC A06/MF A01**  
Corps of Engineers, Washington, D.C.

**Report on Potential Growth of Aquatic Plants of the Lower Mekong River Basin, Laos-Thailand**  
Mark L. Nelson, Edward O. Gangstad, and Donald E. Seaman. Feb 70, 125p TA/OST-AN-70-2-1

Descriptors: \*Aquatic weeds, River basins, \*River basin development, Developing countries, Multiple purpose reservoirs, Weed control, Irrigation canals, Plant growth, Laos, Thailand.  
Identifiers: \*Pa Mong project, Mekong River.

The Pa Mong project is a hydroelectric power and irrigation system on the Mekong River, in Laos and Thailand. Concern has been expressed as to what extent aquatic vegetation, such as water hyacinth, will interfere with the operation and maintenance of the project. This document is the report of a team that was assembled to assess problems, evaluate present methods of dealing with these problems, and make design and research recommendations relevant to multi-purpose water resource projects in the Lower Mekong Basin. Included in the report are a section on growth potentials describing a number of local factors bearing on the aquatic weed problem. (Author)

**PB-207 618** **PC A04/MF A01**  
Lyon Associates, Inc., Baltimore, Md.  
**Usage Manual for Sampling and Testing Laterite and Lateritic Soils and Other Problem Soils of Africa**  
1971, 72p TA/OST-AN-71-6-2  
Contract AID/csd-2164  
Prepared in cooperation with Building and Research Institute, Kumasi, Ghana.

Descriptors: \*Soil tests, Africa, \*Roads, \*Developing countries, Identifying, Sampling, Laterites, Manuals.  
Identifiers: \*Lateritic soils.

Soil testing is an important and integral part of highway design and construction. This manual has as its purpose the provision of basic details on: identifying the various soils; the laboratory equipment required to perform the tests; exploration and sampling techniques for soils; and laboratory test procedures. The format is straightforward and simple with many illustrations provided. It is expected that even inexperienced engineers and technicians will find the manual relatively easy to use in the field. (Author)

**PB-207 619** **PC A04/MF A01**  
Department of Housing and Urban Development, Washington, D.C. Office of International Affairs.  
**Planning Sites and Services Programs. Ideas and Methods Exchange No. 68**  
Alfred P. Van Huyck. Jul 71, 75p TA/OST-AN-71-7-1

Descriptors: \*Residential buildings, Site surveys, \*Project planning, \*Developing countries, Urbanization, Policies, Neighborhoods, Foreign countries, Socioeconomic status.  
Identifiers: Low income families, Lessons learned, Dwelling services projects.

Housing sites and services projects are not a new idea, but the adoption of the concept on a massive scale is only just now gaining credibility as the most feasible method for dealing with the vast numbers of low-income people seeking land and shelter in the developing world. This document analyzes reasons that sites and services projects should be a major part of the urbanization program of the developing countries. It also discusses the lessons to be learned from previous worldwide experience with the sites and services concept. A method is proposed for planning the sites and services project, and suggestions are given as to how the individual project should be viewed in the context of a national program.

**PB-207 625** **PC E01/MF A01**  
Educational Development Center, Newton, Mass.  
**A Comparison Study for Evaluating Primary School Science in Africa**  
Eleanor R. Duckworth. Oct 71, 60 TA/OST-AN-71-10-1  
Contract AID/csd-772



## APPROPRIATE TECHNOLOGY ABSTRACTS

Descriptors: \*Education, \*Developing countries, \*Africa, Education, Performance evaluation, Schools.

Identifiers: \*Science education, Primary schools.

The African Primary Science Program has been developed in eight different African countries and is currently in the initial stages of implementation in these countries. The program differs from conventional science teaching in that it attempts to provide an opportunity for children to know the world on their own terms. Its goals are to equip children with the basis for having their own ideas of interesting ways to use materials that are available to them, of having interesting questions to ask about things, and of ways to go about answering their questions. The report provides an evaluation of the program. In the process, it describes an evaluation methodology which involves the observation of various aspects of children's activity, alone and in groups, in a manner which is conducive to an understanding of what is actually happening.

**PB-207 626** PC A07/MF A01  
Utah State Univ., Logan. Office of International Programs.

**Rural Industrial Technical Assistance (RITA)**  
Lawrence C. Taylor, Dalton Andrade, Robert Collier, and George Seely. Jul 71, 129p TA/OST AN-71-7-2  
Contract AID/la-291  
Prepared in cooperation with the Federal University of Rio Grande do Norte (Brazil).

Descriptors: \*Industries, Developing countries, \*Developing countries, \*Economic development, Training, Selection, Project planning, Cost analysis, Brazil.  
Identifiers: RITA project.

Project RITA (Rural Industrial Technical Assistance), Rio Grande Do Norte, was a program designed to provide assistance in industrial development to selected areas in the interior of the State of Rio Grande Do Norte. The project team consisted of professors and graduate students from the Federal University of Rio Grande Do Norte and from Utah State University. Their efforts involving the study, selection, planning, organization, and establishment of small and medium sized businesses in the project area are reported in this document. (Author)

**PB-207 628** PC A06/MF A01  
Education Development Center, Newton, Mass.  
**Beginning Science Curriculum for English Speaking Tropical Africa (African Primary Science Program)**  
Final rept., 1960-71.  
1 Dec 71, 125p TA/OST-AN-71-12-1  
Contract AID/csd-772

Descriptors: \*Education, \*Developing countries, \*Africa, Education, Ghana, Kenya, Malawi, Nigeria, Sierra Leone, Tanzania, Uganda.  
Identifiers: \*Science education, Curricula.

The African Primary Science Program, which was established in 1960 as part of the African Education Program, has operated widely in English-speaking African countries. Science centers have been established with program assistance in seven of these: Ghana, Kenya, Malawi, Nigeria, Sierra Leone, Tanzania, Uganda. Its goals have been centered on changes in Pedagogy, but it has also sought to influence the role of education in developing countries. The report records and documents the Program's development, its changing structure, and its efforts to respond to the needs of the countries involved and developing African initiative.

**PB-207 636** PC A14/MF A01  
Lyon Associates, Inc., Baltimore, Md.  
**Laterite and Lateritic Soils and Other Problems Soils of Africa. Development of Engineering Standards and Criteria for the Usage of Laterite, Lateritic Soils, and Other Problems Soils in Connection with the Construction of Roads, Highways and Airfields**  
Jun 71, 308p TA/OST AN-71-6-1  
Contract AID/csd-2164

Descriptors: \*Soil properties, \*Africa, \*Roads, \*Developing countries, Laterites, Clay soils, Soil stabilization, Tropical regions, Ghana.  
Identifiers: \*Lateritic soils.

Roadway design practices in the tropics have evolved, by and large, from American and European experience. The adequacy of these procedures, which were devised through experience with temperate zone soils, have never really been evaluated for the climatic conditions, the soils, and the traffic patterns of tropical Africa. It was therefore decided that lateritic materials, so plentiful in tropical areas, should be studied in a thorough research program. This document represents the results of such a study carried out in tropical Africa, with emphasis on Ghana. A review of the pertinent literature is provided for both lateritic soils and tropical black clays, and the engineering properties of both types are described. (Author)

**PB-207 647** PC A10/MF A01  
International Rice Research Inst., Los Banos, Laguna (Philippines).  
**Agricultural Equipment Development Research for Tropical Rice Cultivation**  
Semiannual progress repts. nos. 10, 11, 12, 13, 1 Jan 70-31 Dec 71  
Amir U. Khan, Fred E. Nichols, and J. Bart Duff. 31 Dec 71, 207p TA/OST-AN-71-12-2  
Contract AID/csd-2541

Descriptors: \*Agricultural machinery, Developing countries, Rice, Cultivation, Tropical regions.  
Identifiers: Rice cultivation.

The document deals with efforts toward the design, development, and extension to commercial manufacturers of power-driven equipment suitable for use in the production and processing of rice under tropical conditions. Emphasis has been placed on the development of equipment for use by farmers in the 2- to 10- hectare size category, and which can be fabricated within the countries of the region employing locally available resources and manpower to the maximum extent possible. (Author)

**PB-207 812** PC A03/MF A01  
Virginia Polytechnic Inst. and State Univ., Blacksburg.  
**Wood in the Construction of Mass-Produced Houses**  
Geza Ifju, and E. George Stern. Aug 71, 28p

Descriptors: \*Structural members, \*Structural timber, \*Residential buildings, Mass production, Mechanical properties, Strength weight ratio, Life(Durability), Cost engineering, Foundations, Structural design.  
Identifiers: Low cost housing.

The properties and characteristics of wood, that are important in its engineered use in building and construction and, especially, in the mass-production of low-cost houses, are presented in an up-to-date approach by means of specific examples in a two-part presentation: Part I deals with the properties of wood which make it especially suitable for construction. The principal topics covered are strength-weight relationships and durability. Part II covers recent developments in the use of wood in the prefabrication and mass production of low-cost houses with particular reference to their foundations.

**PB-207 862** PC-GPO/MF A01  
Department of Transportation, Washington, D.C.  
**Preparation and Appraisal of Transport Projects**  
Rept. for 1964-65  
Jun 68, 107p TA-OST-AN-68-6-1  
Paper copy available from GPR \$1.25 as Stock No. TD1.2:T68/6.

Descriptors: \*Developing countries, \*Transportation management, Project planning, Evaluation, Handbooks, Concepts, Methodology, Economic analysis, Engineering standards, Traffic, Systems analysis, Benefit cost analysis, Decision making.

The report is drawn largely from existing economic and engineering knowledge to provide a guide for

making transport investment decisions in the less developed countries. Specific topics include specifying transport problems and identifying alternative courses of action, design of a transport study, analysis of present and potential traffic, capacity of an existing transport system, estimating benefits from transport investments, appraisal of costs and determination of alternative technical solutions, and decision criteria for choosing among alternative investment possibilities.

**PB-207 980** PC A02/MF A01  
Road Research Lab., Crowthorne (England).  
**A Review of Rural Traffic-Counting Methods in Developing Countries**  
J. D. G. F. Howe. 1972, 25p Rept no. RRL-LR427

Descriptors: \*Traffic surveys, Developing countries, \*Vehicular traffic, Rural areas, Counting, Data acquisition, Reviews, Questionnaires, Methodology, Automation, Recommendations.  
Identifiers: Traffic counting methods.

The report reviews methods of rural traffic counting currently used in developing countries and examines the accuracy of the resulting flow estimates. The results of a questionnaire surveys among a sample of developing countries suggest that decisions on the duration, frequency, and timing of counts are at present arbitrary. It is suggested that for increase in the accuracy of rural traffic estimates automatic traffic counters be used on a wider scale than at present.

**PB-208 432** PC A16/MF A01  
Agency for International Development, Washington, D.C. Office of Science and Technology.  
**Science, Technology, and Development. Volume II. Natural Resources. Minerals and Mining, Mapping and Geodetic Control**  
1962, 362p TA/OST-AN-62-13-2  
See also Volume 1, PB-207 495 and Volume 3, PB-207 496.

Descriptors: \*Natural resources, \*Developing countries, \*Mineral deposits, \*Economic development, Geological surveys, Government policies, Organizations, Project planning, Mining engineering, Regional planning, Pakistan, Chile, Mexico, Processing, Mapping.

The volume includes the following papers: Government as a dynamic agent in mineral resource development, The role of national geological surveys in mineral resources development, The importance of a central mines bureau in fostering development of mineral resources, Legislative choices in the development of mineral resources, Development organization and operation of the Institute in Chile, Opportunities for regional organization in mineral resources development, A cooperative program in Pakistan, In-service and university training of geologists and mineral engineers, Non-metallic mineral resources for fertilizers, Regional heavy-mineral reconnaissance for ore deposits in deeply weathered areas with semi-humid to humid and temperate to tropic climate.

**PB-208 527** PC A10/MF A01  
Department of the Interior, Washington, D.C. Office of Library Services.  
**Control of Aquatic Vegetation in Freshwater**  
Bibliographic series  
Patricia A. Skaptason. Mar 72, 219p Rept no. INT-BIB-72-28

Descriptors: \*Aquatic weeds, Control, \*Fresh water, Aquatic weeds, \*Bibliographies, \*Weed control, Herbicides, Aquatic plants.

Bibliography of 851 English language publications dealing with the control of aquatic vegetation in freshwater. Chemical, biological, mechanical, and ecological methods of control are included. Strictly toxicological works were excluded. Covers literature published from 1966 through early 1971. A special feature is provided by the Aquatic Plants Index and the Herbicide Index at the back of the volume. (Author)



# APPROPRIATE TECHNOLOGY ABSTRACTS

**PB-208 550** PC A04/MF A01  
National Academy of Sciences, Washington, D.C.  
**Solar Energy in Developing Countries: Perspectives and Prospects**  
Mar 72, 60p\* TA/OST-NAS-72-34  
Contract AID/csd-2584

Descriptors: \*Solar energy, \*Developing countries, Solar power generation, Utilization, Evaporation, Heating, Drying, Distillation, Air conditioning, Refrigerating, Direct energy conversion.

This is a report of an ad hoc Advisory Panel, made up of specialists from the United States and abroad, to: (1) Assess the state of the art in utilizing solar energy for developing countries and review current practical applications; (2) identify promising areas for research and development; and (3) examine the desirability of establishing an international solar energy institute in North Africa, to carry out solar energy research and development.

**PB-209 172** PC A02/MF A01  
Water Resources Council, Washington, D.C.  
**Summary: Federal Agency Technical Comments on the Special Task Force Report Entitled 'Procedures for Evaluation of Water and Related Land Resource Projects'**  
Final rept.  
Jul 70, 17p Rept no. US-WRC-0088

Descriptors: \*Water resources, Management planning, Project planning, Economic development, Regional planning, Social welfare, Cost analysis, Accounting, Research management, Reviews.

The report contains a condensation of and blending without evaluation of the technical comments by the various agencies. (Author)

**PB-209 175** PC A03/MF A01  
Water Resources Council, Washington, D.C.  
**Principles for Planning Water and Land Resources**  
Final rept.  
Jul 70, 31p Rept no. US-WRC-0091

Descriptors: \*Water resources, Management planning, \*Natural resources, Management planning, Economic development, Regional planning, Social welfare, Benefit cost analysis, Standards, Cost estimates.

The report discusses principles to provide a broad policy framework for planning activities and including the conceptual or theoretical basis for planning. (Author)

**PB-209 176** PC A13/MF A01  
Water Resources Council, Washington, D.C.  
**Standards for Planning Water and Land Resources**  
Final rept.  
Jul 70, 296p Rept no. US-WRC-0092

Descriptors: \*Water resources, Management planning, Standards, Benefit cost analysis, Cost comparison, Economic development, Water supply, Flood control, Social welfare.

The document is a report on Standards to provide uniformity and consistence by comparing, measuring and judging benefits, costs, and alternatives. (Author)

**PB-209 177** PC A10/MF A01  
Water Resources Council, Washington, D.C.  
**A Summary Analysis of Nineteen Tests of Proposed Evaluation Procedures on Selected Water and Land Resource Projects**  
Final rept.  
Jul 70, 212p Rept no. US-WRC-0093

Descriptors: \*Water resources, Management planning, Abstracts, Tests, Regional planning, Standards, Project planning, Economic development, Cost analysis.

The tests pointed up many areas in the report of June 1969, where ambiguities existed and further clarification was required. Test results substantiated

that the June report was concerned primarily with concepts and included only a few standards and procedures to implement them. Tests have indicated that the multiobjective approach to planning is practical. (Author)

**PB-209 942** PC A07/MF A01  
National Water Commission, Arlington, Va.  
**Desalting**  
Final rept. 1969-1971  
Victor A. Koelzer. May 72, 133p\* Rept no. NWC-EES-72-045

Descriptors: \*Desalting, \*Reviews, \*Water supply, Desalting, History, Distillation, Freezing, Osmosis, Ion exchanging, Electrodialysis, Economic analysis, Cost estimates, Capital costs, Operating costs, Electric power demand, Waste disposal, Brines, Marketing.  
Identifiers: Water costs.

Based on a comprehensive review of desalting literature and interviews with experts in the field, the report evaluates the state of the art of desalting technology. It summarizes program on desalting technology, and describes applicability of distillation, crystallization, membrane and chemical processes. In an attempt to evaluate the markets for desalted water, the report looks at water costs, economies of scale and other marketing factors. Applications of desalting technology are considered for incremental supply, to improve quality of supply, for intermittent operations, in dual-purpose plants, to renovate water for reuse, and for agriculture. The report concludes that desalting is presently a technically feasible source of new water for situations of specialized need, and makes research recommendations. (Author)

**PB-210 104** PC A04/MF A01  
Agency for International Development, Washington, D.C. Office of Science and Technology.  
**Science and Technology for International Development: A Selected List of Information Sources in the United States**  
Mar 72, 56p\* Rept no. TA/OST-72-7

Descriptors: \*Information centers, Economic development, \*Developing countries, Bibliographies, Libraries.

The report presents a list of libraries and other organizations which have relatively complete and comprehensive holdings of publications pertaining to science and technology in developing countries. For each of these organizations, information is provided concerning the nature and strength of the collection, publications issue, information services provided, and the individual to contact for further assistance. A listing of reports produced by, for, or with the assistance of AID and which are available from NTIS is given. Also included is a list of reports on science and technology for international development issued by various other international and regional organizations. (Author)

**PB-210 105** PC A08/MF A01  
Agency for International Development, Washington, D. C. Office of Science and Technology.  
**The Role of the Agency for International Development in the Field of Natural Resources Planning and Management**  
Apr 72, 153p Rept no. TA/OST-72-8

Descriptors: \*Natural resources, Management, \*Developing countries, Economic development, Meetings.  
Identifiers: \*Natural resource management.

The report is one of the results of a Workshop on Natural Resource Planning and Management which was held on 21 January 1972 at Washington, D. C. It describes the key issues, significant observations, and major findings and conclusions which emerged from that session, as well as from documentation presented by U. S. technical agencies and multilateral institutions both in advance of and subsequent to the workshop. Some of the subjects covered include: Significance of natural resources to economic growth; constraints on natural resources development; current role of governments, development assistance agencies, and private industry; special capabilities of the United

States for international assistance; activities and perspectives of U. S. technical agencies and international development institutions. (Author)

**PB-210 107** PC A05/MF A01  
National Academy of Sciences, Washington, D.C.  
**Scientific and Technical Information for Developing Countries**  
Apr 72, 92p\* TA/OST-AN-72-4-1  
Contract AID-csd-2584

A report of an Ad Hoc Advisory Panel of the Board on Science and Technology for International Development of the National Academy of Sciences.

Descriptors: \*Information, \*Developing countries, Research, Information retrieval, Information systems.  
Identifiers: \*Transfer of technology, Information resources, Technical assistance.

Scientific and technical information is an essential element in the economic development process. A rationale is needed to guide the formulation of assistance programs addressed to the problem of information resources in less developed countries. This report is intended as a first step toward meeting this need. The first portion elaborates the need for more effective use of scientific and technical information in development efforts, and then outlines a rationale for increased technical assistance in this area. A review is provided of the functions of the information transfer process and the necessary components of the information infrastructure. Consideration is given to specific information requirements of the developing countries in the areas of industrial technology, natural resources, and the scientific and technical disciplines. Finally, a series of recommendations are presented encompassing policy, priorities, programming, administration, and suggested action programs for technical assistance in scientific and technical information. (Author)

**PB-210 128** PC A21/MF A01  
Cornell Univ., Ithaca. Center for Housing and Environmental Studies.  
**Research Methods for Housing and Urbanization Studies in Developing Countries**  
Margaret E. Woods, and Earl W. Morris. 30 Jun 69, 479p TA/OST-AN-69-6-5  
Contract AID/csd-817

Descriptors: \*Residential buildings, \*Puerto Rico, \*Urban development, Latin America, \*Demographic surveys, Developing countries, Research, Sociometrics, Economic factors, Political systems, Family relations, Socioeconomic status, Improvement, Project planning.  
Identifiers: San Juan (Puerto Rico).

A pilot study of urban housing was undertaken in San Juan, Puerto Rico, to design and test methodological tools for the conduct of housing research in the urban areas of Latin America. Social, economic, demographic, and political aspects of urban housing were studied, and the document is based on the findings of that study. The first portion provides a broad survey of methods of survey research and their applicability to the conduct of sample surveys in the urban areas of developing nations. Next, methodology and techniques are presented for measuring housing characteristics and quality, socioeconomic and demographic characteristics of families, attitudes, aspirations, and value orientations with respect to housing, and two means by which a housing situation may be improved.

**PB-210 129** PC A03/MF A01  
Department of Housing and Urban Development, Washington, D. C. Div. of International Affairs.  
**Prolonging Life of Wood in Houses**  
Ideas and methods exchange  
J. Robert Dodge. Jun 67, 43p IME-47, TA/OST-AN-67-6-1  
Revision of reports dated Jul 63 and Dec 57.

Descriptors: \*Wooden structures, \*Wood preservatives, \*Wood preservatives, Residential buildings, Tropical regions, Protection, Curing, Damage, Termites, Coal tar, Creosote, Phenol, Naphthenates, Copper organic compounds, Chlorine aromatic compounds, Drying, Poisons.



Identifiers: \*Wood preservation, Phenol/Pentachloro, Copper naphthenates.

Dwellings constructed entirely or in part of wood frequently deteriorate rapidly due to readily avoidable errors in the design of the structures and in the curing, use, or protection of the wood. This is especially true in the humid tropical areas with a high incidence of insect infestation. This document contains the most widely accepted information on the protection of wood. It is intended to serve as a reference and check list for housing technicians. The topics include: Sources of damage; protection against damage; wood preservatives; methods of treatment; soil poisons; air drying lumber; boilerless dry kilns; drying by solar radiation. (Author)

**PB-210 130** PC A03/MF A01  
Michigan State Univ., East Lansing.  
**Care and Maintenance of Farm Machinery. A Handbook for Farm Operations in Tropical Agriculture Areas**  
Norwin Braun. Jun 68, 49p TA/OST-AN-68-6-2  
Prepared in cooperation with Nigeria Univ., Nsukka.

Descriptors: \*Agricultural machinery, \*Handbooks, \*Developing countries, Agricultural machinery, Maintenance, Farms, Safety, Preventive maintenance, Tropical regions.

A functional farm workshop is a most valuable asset to any university farm. It is even more important in developing countries that are remote from ready access to machinery replacements, spare parts, and company field men. In order to keep machinery in the best working condition, a thorough preventive maintenance program must be developed and closely adhered to. This handbook is intended as a guide for such a program. The first portion concerns itself with farm machinery safety; this is followed by a discussion of the structure and role of the mechanic section of a farm operations department. (Author)

**PB-210 138** PC A04/MF A01  
Jordan (Roy E.), Jr.  
**The Ceramics Industry in Thailand 1970**  
Oct 70, 72p TA/OST-AN-70-10-1  
Contract AID/ea-118

Descriptors: \*Industries, \*Ceramic materials, \*Thailand, Ceramic materials, Economic development, Developing countries, Manufacturing, International trade.

The ceramic industry of Thailand is just beginning to emerge as an economic force in the kingdom. The rapid growth of the ceramic market in Thailand has led to marked expansion in domestic production and has attracted large joint venture investments in manufacturing facilities for ceramic products formerly imported. This report reviews available data and information on Thailand's ceramic industry and trade. Included is information on existing ceramic enterprises as well as approved or planned industrial projects. Sources, relative prices, and the volume of imports are discussed, as well as other aspects of the growth potential in the ceramic sector. Data are also included on raw materials and their locations in the kingdom. A preliminary identification is made of investment opportunities. (Author)

**PB-210 332** PC A12/MF A01  
National Inst. of Community Development, Hyderabad (India).  
**Development and Change in a Bengal Village**  
Research rept.  
Ajit Kumar Danda, and Dipali Ghosh Danda. May 68, 266p RR-20, TA/OST-AN-68-5-2  
Report on the Diffusion of Innovations in Rural Societies. Prepared in cooperation with Michigan State Univ., E. Lansing. Dept. of Communication.

Descriptors: \*Social change, \*India, \*Social communication, \*Developing countries, Attitudes, Agriculture, Community relations.  
Identifiers: West Bengal(India), Technological change.

The report presents a study of the process of planned change in a village of West Bengal, India.

It describes in general terms the positive and negative reactions of farmers toward specific agricultural programs. The special emphasis is on the determination of the causes of rejection of an improved agricultural practice. The communication process of conveying modern ideas and practices to the villagers was also examined. The report describes the physical setting of the village, community structure, development and change, and adoption of innovations. (Author)

**PB-210 345** PC A05/MF A01  
National Academy of Sciences, Washington, D.C.  
**Science and Brazilian Development. Report of the Fourth Workshop on Contributions of Science and Technology to Development**  
Nov 71, 92p TA/OST-NAS-71-37  
Contract AID/csd-1122  
Prepared in cooperation with National Research Council of Brazil, Rio de Janeiro. See also PB-203 391-U.

Descriptors: \*Research management, Brazil, \*Economic development, \*Brazil, Meetings, Research, Agriculture, Mineralogy, Geophysics, Chemistry.  
Identifiers: Technology, Innovation(Technology).

The Fourth Brazil-U.S. Workshop on Science and Technology in Development had three primary objectives: (1) to review Joint Study Group Activities in agricultural research, agricultural economics, computer science, geosciences, and industrial research; (2) to review the operations of the chemistry program and discuss program strategy for 1972-74; and (3) to review the NAS-CNPq bilateral relationship and discuss future directions for joint activities. Recommendations of the workshop are summarized. Additional background information on which the recommendations depend is given in annexes to the report. (Author)

**PB-210 507** PC E01/MF A01  
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.  
**Plant Requirements for Manufacture of Wallboard**  
Jun 67, 63 TA/OST-AN-67-6-2

Descriptors: \*Wallboard, Manufacturing, \*Industrial engineering, Wallboard, Industrial plants, Developing countries, Operating costs, Requirements, Economic analysis.

The term 'wallboard' is applied to those construction materials which may be made from one of several types of fibrous residues, including bagasse, cereal straws, and cornstalks. These sheets are used in many ways in building construction, and the raw materials of which they can be made are to be found all over the world. This document provides a guide for the establishment and operation of a wallboard manufacturing plant. The topics covered include: Principles of wallboard manufacturing; the manufacturing process; building requirements; materials requirements; equipment requirements; labor requirements; overhead rate; unit cost of manufacturing; capital requirements; sales revenue; and projected profit and loss. Detailed operation sheets are given for each major step in the manufacturing process. (Author)

**PB-210 508** PC A04/MF A01  
National Inst. of Community Development, Hyderabad (India).  
**Communication in India. Experiments in Introducing Change**  
Joseph E. Kivlin, Prodipto Roy, Frederick C. Fliegel, and Lalit K. Sen. May 68, 64p TA/OST-AN-68-5-1

Descriptors: \*Social communication, \*India, \*Social change, \*Developing countries, Literacy, Education, Radio communication.  
Identifiers: Technological change.

An often encountered difficulty experienced by development programs involves gaining acceptance of beneficial changes by the populace. This document reports the results of a communication experiment which attempted to induce adoption of modern agricultural, health, and family planning practices by the inhabitants of a number of villages

near Lucknow, Uttar Pradesh, India. The study sought to evaluate the continuing effects of two communication treatments: radio farm forums, and literacy training classes. The results indicate that while knowledge of the practices spreads rather quickly, adoption is slow and at low levels. Some progress was made, however, and clear cut differences in the effectiveness of the communication treatments were exhibited. (Author)

**PB-210 512** PC A08/MF A01  
Agency for International Development, Washington, D.C. Office for Private Overseas Programs.  
**The VITA International Inquiry Service. An Evaluative Review**  
Richard Morse. Mar 72, 156p\* Rept no. TA/OST-AN-72-3-1

Descriptors: \*Information centers, Evaluation, \*Developing countries, \*Information retrieval.  
Identifiers: VITA(Volunteers for International Technical Assistance), Volunteers for International Technical Assistance, Transfer of technology.

Volunteers for International Technical Assistance (VITA), operates a correspondence service which seeks to provide answers to technical inquiries from individuals in developing countries. Such inquiries are usually assigned to one of 5,500 volunteer experts in the U.S. and other nations for answer. This document is a result of a study undertaken to gain a better insight into present and potential achievements and problems of this voluntary approach to responding to technical information needs. It is intended for those interested in the task of adapting and transferring technical knowledge effectively; and for those specifically interested in VITA as a privately managed program through which individuals can contribute to overseas development.

**PB-210 592** PC A21/MF A01  
Battelle Memorial Inst., Columbus, Ohio. Columbus Labs.  
**Transportation Technology for Development. Volume I**  
E. S. Cheaney, R. D. Leis, and D. M. Landreman. Feb 68, 488p TA/OST-AN-68-2-1  
Contract AID/csd-762  
See also Volume 2, PB-210 593.

Descriptors: \*Developing countries, \*Transportation, Management, Construction, Manpower, Capacity, Vehicles, Maintenance, Economic development, Pipeline transportation, Highway transportation, Rail transportation, Air transportation, Water transportation, Passenger transportation, Cargo transportation.  
Identifiers: \*Technology, Modal choices, Intermodal cargo transportation.

This report provides background information on the technology of various transportation modes and their capabilities. It is intended primarily for use by economists, program officers, general engineers, and others in the economic development field. Information is included on the broad capabilities of particular modes to handle freight and passenger traffic; major features and the advantages and limitations of each mode in terms of technical capabilities; levels of technological sophistication that can be adopted within each mode; and the 'inputs' of right-of-way preparation and construction, materials, vehicles, equipment, maintenance, and manpower required at each level to produce an 'output' of transport service. Volume One contains sections on: Intermodal factors of choice in transportation; highway transportation; railway transportation; conventional air transportation; V/STOL aircraft; inland waterway transportation; oceanway transportation; pipeline transportation; and intermodal freight exchange.

**PB-210 593** PC A12/MF A01  
Battelle Memorial Inst., Columbus, Ohio. Columbus Labs.  
**Transportation Technology for Development. Volume II**  
E. S. Cheaney, R. D. Leis, and D. M. Landreman. Feb 68, 265p TA/OST-AN-68-2-2  
Contract AID/csd-762  
See also Volume 1, PB-210 592.



**Descriptors:** \*Development countries, \*Transportation, Monorail railways, Belt conveyors, Ground effect machines, Hydrofoil craft, Power supplies, Factor analysis, Cargo vehicles, Passenger vehicles.

**Identifiers:** Aerial tramways, Off road vehicles, Technological factors, Special purpose vehicles.

The second volume of the transportation technology for development study contains sections on: Aerial tramway transportation systems; beltway (endless moving belt) transportation systems; monorail transportation systems; air cushion (or ground effect, surface effect) vehicle transportation systems; hydrofoil transportation systems; special purpose vehicles (i.e., those capable of moving over terrain away from established route networks); new power sources and their effect on transportation technology; external technological factors (food production, water supply, mining and mineral processing, petroleum production, power generation) and their influence on transportation needs.

**PB-210 594** **PC A10/MF A01**  
Geological Survey, Washington, D.C.  
**Surface-Water Resources of the Yobe River System, Northern Nigeria, 1963-68**  
B. E. Colson. Jan 69, 206p TA/OST-AN-69-1-1  
Prepared in cooperation with the Government of Nigeria.

**Descriptors:** \*Water resources, \*Developing countries, \*Nigeria, \*Watersheds, Hydrographic surveys, Surface waters.  
**Identifiers:** Yobe River.

The Yobe River system, which is tributary to Lake Chad, drains an area of about 33,000 square miles in a semi-arid region of northern Nigeria. This report describes the general hydrologic features of the Yobe drainage basin and presents hydrologic data on gage heights, daily discharge, and analysis of chemical quality and sediment content of water samples for 18 stations in the system. (Author)

**PB-210 595** **PC A03/MF A01**  
National Fertilizer Development Center, Muscle Shoals, Ala.  
**Economic Comparison of Overseas Manufacture and Importation of Anhydrous Ammonia**  
Mar 69, 29p TA/OST-AN-69-3-1

**Descriptors:** \*Ammonia, \*International trade, \*Developing countries, Ammonia, \*Fertilizers, Developing countries, Economic analysis, India, South Vietnam, Uruguay, Cost estimates, Production, Chemical engineering.  
**Identifiers:** Imports.

Ammonia is the principal form in which fixed nitrogen is used in the manufacture of fertilizer materials. The production of ammonia by reacting hydrogen with atmospheric nitrogen is the basis of the modern nitrogen fertilizer industry. The report compares the economics in developing countries of importing ammonia from suppliers having large plants and low-cost feedstocks with those of producing the material under local conditions. Three countries, India, South Vietnam, and Uruguay, are used as a basis of the comparison. As these countries have widely divergent needs for fertilizer materials, the costs applicable to them should be representative of many other developing countries with similar needs and resources. (Author)

**PB-210 596** **PC A05/MF A01**  
Foreign Agricultural Service, Washington, D.C.  
**Technological Change in Agriculture. Effects and Implications for the Developing Nations**  
Dana G. Dalrymple. Apr 69, 88p TA/OST-AN-69-4-2

**Descriptors:** \*Agricultural economics, \*Developing countries, Mass production, Grain crops, Agricultural machinery, Policies, Economic development, Project planning.  
**Identifiers:** Technological change.

The effects of technological changes in agriculture in the less developed countries are a matter of increasing concern. As efforts to expand agricultural production begin to pay off, the many and complex

ramifications of technological change become more and more evident. This document provides an introduction to some of the major effects of technological change in agriculture. Included among the topics considered are: The nature of technological change; adoption process for agricultural technology; impact of changes in agricultural technology; high-yielding varieties of grain; mechanization of agriculture; and policy implications of technological change. (Author)

**PB-210 597** **PC A08/MF A01**  
Foreign Economic Development Service, Washington, D.C.  
**An Analysis of the Potentials and Prospects of Increasing Edible Oil Production in West Pakistan**  
Frederic A. Coffey, D. M. Yermanos, J. R. Wilcox, B. M. Waddle, and P. F. Knowles. Sep 71, 170p FEDS-Field-11, TA/OST-AN-71-9-2

**Descriptors:** \*Vegetable oils, \*Developing countries, Production, Cottonseed, Soybeans, Peanuts, Safflower oil, Sesame oil, Oilseeds, West Pakistan.  
**Identifiers:** \*Sunflower seeds.

The report represents one phase of a study on the potential for increasing oilseed production in West Pakistan. It provides a review of research, production potential, and problems of oilseed production and processing in Pakistan and in the United States and other countries where relevant. It includes a general economic analysis as well as detailed discussions on the production of safflower, sesame, peanuts, soybeans, sunflowers, and cottonseed. (Author)

**PB-211 367** **PC A04/MF A01**  
Agency for International Development, Washington, D.C. Office of Science and Technology.  
**Desert Encroachment on Arable Lands: Significance, Causes, and Control**  
Aug 72, 61p Rept no. TA/OST-72-10

**Descriptors:** \*Deserts, Stabilization, \*Arable land, Protection, Dunes, Soil stabilization, Water table, Cultivation, Soil erosion, Soil conservation, Arid land.  
**Identifiers:** \*Desert encroachment, Dune progression, Water management.

Desert encroachment is a problem of significant economic consequence in a number of developing countries. The problem becomes more acute as population increases. The report gives an overview of the causes and significance of the problem and the state-of-the-art of control methods. It highlights causes and significance, gaps in knowledge and technology, and the nature and potential of recent efforts to control desert encroachment. (Author)

**PB-211 428** **PC A03/MF A01**  
National Fertilizer Development Center, Muscle Shoals, Ala.  
**Engineering Evaluation of Selected Fertilizer Production Facilities in Colombia**  
I. W. McCamy, and D. R. Waggoner. Aug 70, 43p Bull-Y-10, TA/OST-AN-70-8-1

**Descriptors:** \*Fertilizers, Developing countries, \*Industrial plants, Evaluation, Production methods, Flow charts, Operating costs, Investments, Blending, Handling equipment, Colombia.

The report is the result of a study by a team of experts of two segments of the Colombian fertilizer industry: (1) the facilities of Fertilizantes Colombianos, S.A. (FERTICOL), and (2) a sampling of small bulk-blending plants. The first part of the report provides general information about the fertilizer situation in Colombia. The results of the analysis of the FERTICOL plant are then presented. This includes flow diagrams of alternative production schemes, and projections of investment and operating costs. Similarly, operating problems are identified and alterations in equipment, raw materials, and procedures to improve operations are suggested for the bulk-blending plants. (Author)

**PB-211 444** **PC A05/MF A01**  
Iowa State Univ., Ames. Center for Agricultural and Rural Development.

**Future Alternatives Affecting the Agricultural Demand for Water and Land: The Effects of Soy Protein Meats and Nitrogen Fertilizer Restrictions on Future Water and Land Use**  
Final rept.  
Howard C. Madsen, Earl O. Heady, Stanley H. Hargrove, and Kenneth J. Nicol. Jun 72, 93p \*NWC-F-72-054  
Contract NWC-72-012

**Descriptors:** \*Land use, \*Agriculture, \*Water resources, Agriculture, \*Food supply, Substitutes, \*Fertilizers, Utilization, Soybeans, Meat, Proteins, Nitrogens, Irrigated land, Water consumption, Mathematical models, Forecasting, Linear programming.  
**Identifiers:** Soy protein concentrate.

The study evaluates the impact on land and water needs and farm prices if either soy protein meat analogs and extenders were substituted for part of the beef consumption in the year 2000 or nitrogen fertilizer application in the year 2000 were restricted to 100 pounds per acre and 50 pounds per acre. The study is based on a large-scale linear programming model of U.S. agriculture. Results of the soy protein meats policy models indicate that with soy protein meats accepted by consumers, productive capacity of U.S. agriculture would surpass any level previously experienced in this nation. Results of the two fertilizer limitation policy models indicate that a mild restriction on the use of nitrogen fertilizer would not strain the productive capacity of U.S. agriculture. A severe restriction, however, would reduce the supply capacity of U.S. agriculture considerably. (Author)

**PB-211 473** **PC A04/MF A01**  
North Carolina Univ., Chapel Hill. Dept. of Environmental Sciences and Engineering.  
**Engineering Measures for Control of Schistosomiasis**  
Frederick E. McJunkin. Sep 70, 71p TA/OST-AN-70-9-2  
Contract AID/csd-2487

**Descriptors:** \*Schistosomiasis, Control, \*Environmental engineering, Schistosomiasis, \*Irrigation canals, Schistosomiasis, Water quality, Parasitic diseases, Infectious diseases, Tropical regions, Developing countries, Bibliographies.

The water-related disease schistosomiasis (or bilharziasis) infects more people today than ever before in history, perhaps as many as 200 million people. Its increasing incidence and widespread prevalence are due in large measure to tropical irrigation and hydroelectric projects, implemented by engineers. This report provides background information on schistosomiasis and its control to enable engineers to work effectively with other professionals in design and operation of schistosomiasis control programs. It also seeks to improve understanding on the part of epidemiologists, malacologists, physicians, and others of the role of engineers in control of schistosomiasis. The present status of engineering measures for schistosomiasis control is summarized, and some possible approaches and opportunities for more effective control of schistosomiasis by engineers are outlined. A bibliography of relevant publications is included.

**PB-211 487** **PC A03/MF A01**  
National Academy of Sciences-National Research Council, Washington, D.C. Office of the Foreign Secretary.  
**The Central American Workshop on the Environment and Development. Antigua, Guatemala, July 25-30, 1971**  
Jul 71, 37p TA/OST-AN-71-7-3  
Contract AID/csd-2584

**Descriptors:** \*Economic development, \*Central America, \*Ecology, Developing countries, Meetings, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Agriculture, Industries, Services, Regional planning, Education.

The primary goals of the Workshop were: to stimulate awareness of environmental factors in economic development among leaders in Central America; and to lay the groundwork for concerted actions within the established framework of the



Common Market countries (Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua). This document records the issues discussed and the conclusions reached. The focus of the workshop was upon the industrial, agricultural, and service industry factors. Consideration was also given to the human environment (principally population pressures), to planning at the regional level, and to educational consequences of environmental problems. (Author)

**PB-211 628** **PC A11/MF A01**  
National Fertilizer Development Center, Muscle Shoals, Ala.  
**Training Manual for Fertilizer Plant Operators**  
Oct 70, 247p\* Circular-Z-17, TA/OST-AN-70-10-4

Descriptors: \*Fertilizers, \*Chemical plants, \*Manuals, Chemical plants, \*Chemical engineering, Fertilizers, Operators(Personnel), Developing countries, Conveyors, Dust collectors, Weight measurement, Fork trucks, Sampling, Packagings, Pumps, Compressors, Valves, Fluid filters, Chemical reactors, Centrifugal classifiers, Comminution, Refrigerating machinery, Maintenance, Safety.

The purpose of the manual is to assist in the training of fertilizer plant operators in the developing countries. It is an effort to share with the chemical industries in these countries experience that has been obtained over many years of operation at the National Fertilizer Development Center. Simple instructions, accompanied by abundant diagrams, are provided for all types of equipment to be found in most fertilizer plants. The topics covered include: Conveyors, elevators, crushers, screens, bins, tanks, dust collectors, weighing equipment, forklifts, front-end loaders, sampling, packaging, pumps, compressors, valves, pipeline flows, filtering equipment, absorption and spray tower, agitation, overhead cranes, common instrumentation, burners, centrifuges, heating and cooling equipment, granulating equipment, neutralization and reaction equipment, concentration equipment, refrigeration equipment, preventive maintenance, lubrication, and safety. (Author)

**PB-211 629** **PC A04/MF A01**  
National Fertilizer Development Center, Muscle Shoals, Ala.  
**Technical and Economic Evaluation of Fertilizer Intermediates for Use by Developing Countries**  
G. C. Hicks, R. D. Young, J. J. Stumpe, M. M. Norton, and M. J. Richards. Mar 70, 56p Bull-Y-3, TA/OST-AN-70-3-1

Descriptors: \*Fertilizers, Developing countries, International trade, Economic analysis, Liquid ammonia, Nitrogen inorganic compounds, Liquids, Phosphoric acids, Phosphorus, India, Vietnam, Uruguay.  
Identifiers: South Vietnam.

In the past comparatively little emphasis has been placed on the position of fertilizer intermediates in supplying the fertilizer needs of the developing countries. This document provides an economic analysis of the prospects for fertilizer intermediates in the developing countries. An effort is made to rationalize the economic and practical examples by hypothetical planning exercises for the case of a few typical countries (India, South Vietnam, Uruguay) with large and small needs for fertilizers. The intermediates of primary concern are anhydrous liquid ammonia, low or nonpressure nitrogen solutions, phosphoric acid, and elemental phosphorous. (Author)

**PB-211 639** **PC A04/MF A01**  
National Fertilizer Development Center, Muscle Shoals, Ala.  
**Fertilizer Distribution in Indonesia - 1969**  
John R. Douglas, Jr, Paul J. Stangle, and James E. Hawes. Feb 70, 61p Bull-Y-1, TA/OST-AN-70-2-3

Descriptors: \*Fertilizers, Developing countries, Distributing, Marketing Inventories, Indonesia.

During recent years chemical fertilizers have been used with ever-increasing frequency in Indonesia.

This report provides the results of a study of fertilizer marketing and distribution with special reference to the operation of P. N. Pertani, a government organization which is a major distributor of fertilizers. Among the topics covered are: Organization of P. N. Pertani headquarters unit and typical field units; fertilizer stocks and accounting procedures; procedures for determining fertilizer demand; credit availability; inventory management procedures; and relationship of P. N. Pertani to private enterprise. (Author)

**PB-211 640** **PC-GPO/MF A01-NTIS**  
Forest Products Lab., Madison, Wis.  
**Low-Cost Wood Homes for Rural America - Construction Manual**  
L. O. Anderson. May 69, 114p A/OST-AN-69-5-1  
Paper copy available from GPO \$1.00 as A176:364.

Descriptors: \*Houses, \*Wood, \*Construction, Manuals, Rural areas, Wooden structures, Cost factors.

Improved housing for rural families means, in many cases, a home that is low in first cost, easily maintained and equipped for good family living. This manual provides details on the construction of such housing, with special reference to methods and materials which will hold down costs, but will insure quality. It gives step-by-step information on every phase of house construction, from the construction of the foundation or supporting units to the final painting and finishing. The manual may be particularly useful to those who plan rural housing efforts; the contractors and skilled and unskilled laborers who will be concerned with the actual construction. (Author)

**PB-211 641** **PC A04/MF A01**  
Foreign Economic Development Service, Washington, D.C.  
**Food Marketing in Developing Countries**  
Bibliography series  
Robert W. Taylor. Dec 71, 56p TA/OST-AN-71-12-3  
Also available as A.I.D. Bibliography Series-6.

Descriptors: \*Food, Developing countries, Marketing, Bibliographies, Abstracts, Indexes(Documentation).

The document brings together a summary of studies on the domestic marketing of food in the less developed countries which have been done by or for the Agency for International Development. It is essentially a bibliography with an abstract provided for each bibliographic entry. The entries are arranged by general subject, by geographic region, and by commodity. A personal/corporate author index is included. (Author)

**PB-211 642** **PC A03/MF A01**  
Auburn Univ., Ala. International Center for Aquaculture.  
**Proposed Cooperative Fishery Program for Ecuador**  
H.S. Swingle. 25 May 71, 44p TA/OST-AN-71-5-1

Descriptors: \*Fisheries, \*Ecuador, Projects, Aquaculture, Fishes, Shrimps, Reviews, Developing countries.

The report is a result of a survey which was undertaken to determine how the U. N. Food and Agriculture Organization and the U.S. Agency for International Development could best coordinate their fisheries programs to provide joint assistance of most benefit to Ecuador. Some of the topics discussed are: Reorganization of the Departamento Piscicultura; soils, water, and fish in the Oriente; the coastal area near Esmeraldas; and introduced species of fishes in Ecuador. In addition, an outline is provided for a proposed coordinated fisheries program. (Author)

**PB-211 643** **PC A03/MF A01**  
Auburn Univ., Ala. International Center for Aquaculture.  
**Fishculture Survey Report for Costa Rica**  
R. T. Lovell, and D. D. Moss. 1 May 70, 42p TA/OST-AN-70-5-2

Descriptors: \*Aquaculture, \*Costa Rica, Developing countries, Surveys, Fisheries, Education, Capital, Research.

The report presents observations and recommendations which are made as a result of a survey of the inland fisheries of Costa Rica. The survey was undertaken for the purpose of providing technical advice on freshwater fisheries research programs in the country and on developing programs for the production of fish for food by farmers or commercial investors. The topics covered in the report include: General conditions in Costa Rica which may affect fishculture considerations; government divisions responsible for fisheries development; fishculture research and training; and available sources of capital, land and feedstuffs. (Author)

**PB-211 658** **PC A06/MF A01**  
Foreign Economic Development Service, Washington, D.C.  
**The Marketing Challenge. Distributing Increased Production in Developing Nations**  
Martin Kriesberg. Dec 70, 104p FEDS-7, TA/OST-AN-70-12-4

Descriptors: \*Marketing, \*Developing countries, \*Food, Marketing, Meetings, Proceedings, Policies, Socioeconomic status, Project planning, Nutrition, Systems analysis, Problem solving, Surveys.  
Identifiers: Technical assistance.

Inadequate transportation and storage, poor market information, lack of capital, and other chronic marketing problems in developing countries have been dramatized by recent production increases. The document is based on a symposium which was organized to focus attention and resources on food marketing in developing nations. Topics covered include: Key considerations in marketing policies; marketing enterprises and the flow of resources into marketing functions; nutrition and marketing food for the needy; efficiency in the marketing system; regional experiences in marketing problems and priorities; and approaches to technical assistance.

**PB-211 663** **PC A06/MF A01**  
Auburn Univ., Ala. International Center for Aquacultures.  
**Inland Fisheries Progress in Thailand, 1971**  
H. S. Swingle, and E. W. Shell. 15 Jan 72, 117p TA/OST-AN-72-1-2

Descriptors: \*Fisheries, \*Thailand, \*Developing countries, Fisheries, Aquaculture, Research, Project planning, Shrimps, Fresh water fishes, Parasites, Productivity, Statistical data.

The document provides a review and evaluation of the status of and the progress made by the Thailand inland fisheries program during 1971. Some of the topics covered are: Highlights of 1971 research results (village reservoir management, efficiency of various fish species, combined rice and fish culture, cage and pen culture of fish, freshwater shrimp culture); parasites affecting fish and man; problems arising in culture and marketing of Trichogaster pectoralis and Clarias Batrachus; Hatchery production and fish distribution; Department of Fisheries organization; titles of current and recently completed fisheries research projects; synopsis of physical and biological data for the fisheries units and the fisheries research stations; fisheries statistics. (Author)

**PB-211 669** **PC A13/MF A01**  
Stanford Research Inst., Menlo Park, Calif.  
**Marketing of Staple Food Crops in Tropical Africa: Overall Analysis and Report**  
Final rept.  
William O. Jones. Jun 69, 280p TA/OST-AN-69-6-6  
Contract AID/csd-801

Descriptors: \*Food, Developing countries, Marketing, Supply(Economics), Urban areas, Commerce, Diets, Efficiency, Sub-Saharan Africa, Kenya, Nigeria.  
Identifiers: \*Sierra Leone.



## APPROPRIATE TECHNOLOGY ABSTRACTS

The report is an end product of a study undertaken to identify practical methods for increasing the efficiency with which staple foodstuffs are marketed in tropical Africa. It describes the structure of selected food marketing systems in tropical Africa in terms of product flow, exchange levels, personnel, and marketing; it appraises the performance of the system; and it identified measures that might be adopted to improve its efficiency. The specific subjects of the report are the trade in staple foodstuffs in the supply hinterlands of four major cities: Nairobi, Kenya; Enugu, Nigeria; Ibadan, Nigeria; and Freetown, Sierra Leone. (Author)

**PB-211 671** PC A04/MF A01  
Auburn Univ., Ala. International Center for Aquaculture.  
**Aquacultural Developments in Peru**  
D. C. Moss. 30 Apr 72, 57p TA/OST-AN-72-4-2

Descriptors: \*Aquaculture, \*Peru, Developing countries, Fisheries, Personnel development, Research, Peru.

As part of an overall effort to reduce the outlay of foreign exchange for the importation of beef, the Government of Peru is striving to develop to the fullest extent the country's fisheries resources. An important part of this effort involves aquaculture. This report reviews the present status of aquaculture in Peru and provides a series of recommendations for future development. Some of the topics covered include the potential for coldwater and warmwater fishculture; a proposed project for culturing fish in pens; a proposed warmwater aquacultural research station; organizational structure of the Ministry of Fisheries; existing fisheries stations and equipment; and fisheries personnel and their training. (Author)

**PB-211 672** PC A03/MF A01  
Rutgers - The State Univ., New Brunswick, N.J. Dept. of Food Science.  
**Corn Fortification: A Field Demonstration Model**  
Leonardo J. Mata, Ricardo Bressani, Paul A. Lachance, and Miguel A. Guzman. 12 Jun 71, 45p TA/OST-AN-71-6-3

Descriptors: \*Nutrition, Developing countries, Corn, Additives, Nutritional deficiencies, Proteins, Experimental design, Guatemala, Central America. Identifiers: Food fortification.

Protein deficiency is a major problem in Central America, as it is in most societies throughout the world that occupy similar ecosystems. An apparent measure to correct this deficiency in utilizable protein would be to increase the production and consumption of animal protein, but the approach has very serious economic and socio-cultural limitations. A nutrition improvement approach that appears to be feasible is the fortification of a food that is normally part of the regular diet to a level sufficient to correct the protein deficiency. In the Central American countries corn, which is consumed primarily in the form of tortilla, would seem to lend itself well to this technique. This document outlines a proposed field methodology to determine the feasibility of the corn fortification approach at the community level. (Author)

**PB-211 761** PC A06/MF A01  
National Fertilizer Development Center, Muscle Shoals, Ala.  
**A Fertilizer Program for Bolivia**  
D. A. Russel, R. J. Ballew, J. I. Bucy, and D. A. Waitzman. Jun 70, 114p Bull-Y-9, TA/OST-AN-70-6-7

Descriptors: \*Fertilizers, Developing countries, International trade, Wheat, Productivity, Marketing, Potatoes, Rice, Fruit crops, Coffee trees, Oilseed crops, Sugarcane, Benefit cost analysis, Tables(Data), Bolivia.

Bolivia annually imports over \$23 million of agricultural products, including wheat, edible oils, fibers, and dairy products. Wheat is by far the most costly of these imports, and it also seems the most amenable to increased domestic production through the use of new varieties and fertilizers. With lower costs, fertilizer could also be profitably used on

such crops as corn, quinoa, rice, cotton, and sugarcane. This document provides a review of the fertilizer program in Bolivia, evaluates its need for fertilizer plants, and analyzes the possibilities for fertilizer marketing. (Author)

**PB-211 762** PC A05/MF A01  
Agency for International Development, Karachi(Pakistan).  
**The Feasibility of Harvesting, Processing and Marketing Tuna in Pakistan**  
Alvin M. Morgan, S. A. Jalil, Masood A. Burney, Douglas M. Jones, and James G. Unti. 1970, 96p TA/OST-AN-70-13-3  
Prepared in cooperation with Government of Pakistan, Dept. of Fisheries.

Descriptors: \*Fisheries, Developing countries, \*Pakistan, Fisheries, Tunas, Food processing, Fishing grounds, Coasts, Marketing, Economic development, Canning, Freezing.

The geographical locale of Karachi, with access to known productive tuna fishing areas along with a coastal population of traditional fishermen, are favorable considerations in the development of a deep sea tuna fishing industry for Pakistan. There is an increasing world demand for both frozen and canned tuna, especially in the highly industrialized nations of the world. This market offers the opportunity for Pakistan to earn foreign exchange for such other goods that are required for industrial expansion and economic development. This report is primarily concerned with two aspects of tuna fishery development: a fishery fleet, and a fish canner. (Author)

**PB-211 774** PC A03/MF A01  
Auburn Univ., Ala. International Center for Aquaculture.  
**Fisheries of Turkey**  
H. S. Swingle. 20 Jan 72, 28p TA/OST-AN-72-1-3

Descriptors: \*Fisheries, Developing countries, \*Turkey, Aquaculture, Food, Population(Statistics), Chemical laboratories, Laboratory equipment, Water chemistry, Limnology.

The document briefly reviews the status of the Turkish fisheries program, and provides some recommendations for possible development. The topics covered include: Food and population; water areas and fisheries; government divisions and universities dealing with fisheries; possibility of fisheries in the poppy-growing areas. Also included are a list of equipment and chemicals needed for a basic water chemistry laboratory; a list of equipment needed for a basic limnological research laboratory; and a brief list of references of possible use in identifying fishes of Turkey. (Author)

**PB-211 775** PC A04/MF A01  
Auburn Univ., Ala. International Center for Aquaculture.  
**Status of Trout Culture in Peru**  
E. W. Shell. 15 Aug 71, 54p TA/OST-AN-71-8-1

Descriptors: \*Aquaculture, Developing countries, \*Peru, \*Trout, Fisheries, Evaluation.

The document reports the results, and provides recommendations based on those results, of a survey of trout hatcheries and trout farms in Peru. The purpose is to evaluate the potential for trout farming in Peru and to evaluate certain aspects of the Ministry of Fisheries' proposed program for the development of the trout farming industry. (Author)

**PB-211 843** PC A03/MF A01  
Kansas State Univ., Manhattan. Food and Feed Grain Inst.  
**Recommendations for FECOAGROH Grain Storage and Handling Facilities in Honduras**  
Rept. no. 24  
Elwyn S. Holmes. Jul 71, 44p TA/OST-AN-71-7-4  
Contract AID/csd-1588  
Report on Food Grain Drying, Storage, Handling and Transportation.

Descriptors: \*Grains(Food), Food storage, \*Food storage, \*Honduras, Food processing, Ware-

houses, Structural design, Materials handling equipment, Drying, Developing countries..

The report provides details concerning the development, design, and evaluation of grain receiving, storage, and handling facilities for the National Federation of Agricultural Cooperatives (FECOA-GROH) in Honduras. Detailed descriptions and plan views are given of recommended facilities. An appendix lists U. S. manufacturers and suppliers of equipment referred to in the report. The document may be of interest to those planning grain storage and handling facilities elsewhere.

**PB-211 882** PC A04/MF A01  
Foreign Economic Development Service, Washington, D.C.

**A Review of Certain Aspects of the Forestry Program and Organization in Indonesia**  
Burnett H. Payne, and David S. Nordwall. 23 Apr 71, 62p FEDS-Field-10, TA/OST-AN-71-4-1

Descriptors: \*Forestry, Indonesia, Developing countries, Forest land, Organizations, Classifications, Protection, Reforestation, Statistical data, Marketing, Productivity.

Indonesia's forest resources represent one of her most valued assets. These resources are not inexhaustable, however, and it is essential to protect them from destructive exploitation. This report provides a review of timber operations in Indonesia, identifies problem areas, and offers a series of recommended solutions. Emphasis is placed on the organization of the Directorate General of Forestry; the use of forest lands, particularly with respect to the granting of timber concessions; the forestry research program; and environmental considerations. (Author)

**PB-211 883** PC A05/MF A01  
Kansas State Univ., Manhattan. Food and Feed Grain Inst.  
**Observations and Recommendations for Improving Grain Storage and Marketing in Bolivia**  
Rept. no. 22  
Floyd F. Niernberger, and Harry B. Pfost. May 71, 96p TA/OST-AN-71-5-2  
Contract AID/csd-1588  
Report on Food Grain Drying, Storage, Handling and Transportation.

Descriptors: \*Grains(Food), Food storage, \*Food storage, \*Bolivia, Marketing, Transportation, Wheat, Rice, Corn, Soybeans, Warehouses, Evaluation, Food sanitation, Developing countries.

The report provides an evaluation of storage and related marketing requirements for the development of the wheat, rice, corn, and soybean industries in Bolivia. Both observations on present conditions and recommendations for future development are given. A 27-page appendix presents detailed guidelines for determining the capacity of various components of a grain storage facility, which should prove generally useful to those interested in this field.

**PB-211 909** PC-GPO/MF A01-NTIS  
Dow Chemical Co., Midland, Mich. Functional Products and Systems.  
**A Literature Search and Critical Analysis of Biological Trickling Filter Studies - Volume I**  
Water pollution control research series.  
Dec 71, 330p EPA-17050-DDY-12/71-1  
Contract FWPCA-14-12-474  
See also Volume 2, PB-211 910.  
Paper copy available from GPO \$2.50 as EP2.10:17050DDY12/71.

Descriptors: \*Trickling filtration, \*Reviews, \*Sewage treatment, Trickling filtration, \*Industrial waste treatment, Trickling filtration, History, Design, Maintenance, Performance evaluation, Research, Patents, Cost estimates, Ecology, Aerobic processes, Trickling filters, Chemical industry, Food processing, Laundries, Water pollution, Agricultural wastes, Metal industry, Drug industry, Fermentation, Paper industry, Radioactive waste processing, Textile industry.  
Identifiers: Biological industrial waste treatment, Brewing industry, Military facilities, Poultry processing, Tanneries, \*Water pollution control.



## APPROPRIATE TECHNOLOGY ABSTRACTS

A two volume compilation, review and critique of the literature on biological trickling filter studies and related pollution abatement processes have been made. In the report, the literature review and critical analysis, is divided into: Introduction, definitions, history and background theory of the trickling filter process; Plant design, materials of construction, operation, maintenance and performance; Trickling filter research and development approaches, ecology, and patents, and Applications of trickling filter to specific industrial wastes. Based on the review, several general conclusions were drawn. There is no well-defined theory of design and operation. Much published work was redundant, and European efforts were not readily accepted in the United States, and vice versa. The literature reflects cycles of interest in trickling filters. The process is not applicable to all pollution problems, but its shock survival capabilities and rapid flow-through time are definite advantages which cannot be overlooked in any design of a waste treatment facility.

**PB-212 001** **PC A05/MF A01**

General Oceanology, Inc., Cambridge, Mass.  
**Commercial Feasibility of Fish Protein Concentrate in Developing Countries. Volume II, Part I. Chile, Investment Aspects and General Summary**  
 Final rept.  
 Gerald D. Bernstein. 26 Jun 70, 78p GO-12-Vol-2-Pt-1, TA/OST-AN-70-6-5  
 Contract AID/csd-2158  
 Prepared in cooperation with American Technical Assistance Corp., and Sidney M. Cantor Associates, Inc. See also Volume 1, PB-195 913 and Volume 2, Part 2, PB-212 002.

Descriptors: \*Fish protein concentrates, \*Chile, \*Developing countries, \*Food industry, Feasibility, Systems engineering, Marketing, Organizations, Competition, Financing, Proteins, Cost analysis, Investments, Food processing.

The report analyzes the feasibility of commercial production of fish protein concentrate (FPC) in Chile. This first Part consists essentially of summaries and condensations of the significant portions of the study, with enough detail to enable it to stand as an independent document. The topics covered include: The Chilean food system and the potential market for FPC; the isopropyl alcohol process and possible competitors; cost of FPC production; company organization and financing structure for an FPC enterprise in Chile; and alternative protein sources.

**PB-212 002** **PC A13/MF A01**

General Oceanology, Inc., Cambridge, Mass.  
**Commercial Feasibility of Fish Protein Concentrate in Developing Countries. Volume II, Part II. Chile, Background Information and Supporting Data**  
 Final rept.  
 Gerald D. Bernstein. 21 Jul 70, 290p GO-12-Vol-2-Pt-2, TA/OST-AN-70-6-6  
 Contract AID/csd-2158  
 Prepared in cooperation with American Technical Assistance Corp., and Sidney M. Cantor Associates, Inc. See also Volume 2, Part 1, PB-212 001.

Descriptors: \*Fish protein concentrates, \*Chile, \*Developing countries, \*Food industry, Feasibility, Marketing, Food processing, Fishes, Cost analysis, Proteins, Nutrition, Investments, Industrial plants.  
 Identifiers: Curico Province(Chile), Fortified foods.

The report analyzes the feasibility of commercial production of fish protein concentrate (FPC) in Chile. This second Part of the report provides detailed information from which the discussions and conclusions of Part I were drawn. The subjects covered include: The Chilean food situation and market for FPC; proposed specifications and quality characteristics for FPC; selection of process and plant capacity; plant design and construction; process description; raw fish supply; cost of production and investment for a fish protein concentrate plant; modified FAO provisional pattern for protein; relationships among income, food distribution, and per capita calorie and protein intakes in Chile; survey of nutrition and health patterns in

Chile; acceptability of fortified foods in the province of Curico.

**PB-212 034** **PC A08/MF A01**

Agency for International Development, Washington, D.C.  
**Introduction to Record Keeping in a Small Enterprise**  
 R. F. Bruckart. May 68, 154p TA/OST-AN-68-5-3  
 Prepared in cooperation with the Industrial Development Center, Zaria (Nigeria).

Descriptors: \*Records management, \*Manuals, \*Industrial plants, \*Nigeria, Management engineering, Commerce, Developing countries, Supervisors, Statistical data.  
 Identifiers: Small businesses.

Much experience is available on the fundamental methods employed by managers of small businesses in industrially developing countries who have developed profitable operations. Effective record-keeping, it has been found, is one of the methods. The document introduces basic record-keeping methods similar to those that managers of small industries throughout the world have found useful. The topics covered include: Recording daily transactions; planning and controlling production; records of material or supplies; quality control records; employee records; and how the manager uses records. The document was prepared for use by small-enterprisers in Northern Nigeria, but it should be generally applicable elsewhere.

**PB-212 035** **PC A06/MF A01**

Geological Survey, Washington, D.C.  
**Hydrology and Water Resources Development in Nepal**  
 Open file rept.  
 W. W. Evett. Jun 69, 112p TA/OST-AN-69-6-7

Descriptors: \*Nepal, \*Water resources, Hydrology, Ground water, Economic development, Rivers, River basin development, Developing countries, South Asia.

Water has long been recognized as one of Nepal's most promising resources. Yet, prior to 1960 little had been done to investigate and appraise the resource. By 1969, a nationwide network of hydrological stations had been established, and a ground-water exploration effort had begun. Furthermore, the Department of Hydrology and Meteorology had been established, staffed, and equipped to conduct investigations. The report discusses the history of hydrological investigations in Nepal, and the relation of these investigations to the social and economic problems of water-resources development and management. The general hydrology of the more important river systems of the country is described in detail. (Author)

**PB-212 101** **PC A04/MF A01**

Cornell Univ., Ithaca, N.Y.  
**Plant Protection Problems in Southeast Asia**  
 Edward H. Glass, Roy J. Smith, Jr, Ivan J. Thomason, and H. David Thurston. 1971, 74p TA/OST-AN-71-13-1  
 Contract AID/csd-3296  
 Prepared in cooperation with East Asian Pest Management Study Team, and California Univ. Sponsored in part by Agricultural Research Service, Washington, D.C.

Descriptors: \*Plants(Botany), Pest control, \*Pest control, \*Southeast Asia, Insect control, Crop weeds, Plant diseases, Pesticides, Developing countries.

Improved crop protection can do little to reduce the population explosion in East Asia, but it can make important contributions toward assuring an adequate food supply until populations become stabilized through family planning and birth control. This document is the report of a study team which has as its objective the appraisal of the nature and the scope of pest problems affecting food production in the Philippines, Thailand, Malaysia, Taiwan, Hong Kong, Singapore, and Japan. An effort was also made to determine whether the local environment and public health are endangered by improper use and lack of management of pesticides on

food and other major crops. Specifically, consideration is given to the status and needs of crop protection in Tropical East Asia; economic and environmental implications of crop protection; possible approaches to solutions of crop protection problems; some international and foreign agencies in plant protection activities in tropical East Asia; and pesticides in public health activities.

**PB-212 238** **PC A04/MF A01**

Agency for International Development, Washington, D.C.  
**Fisheries**  
 Bibliography Series.  
 1 Jun 71, 62p Rept no. Agriculture-5

Descriptors: \*Fisheries, Bibliographies, \*Developing countries, Fisheries, Fish protein concentrates, Marketing, Food processing, Surveys, Research, Economic development, Africa, Asia, Latin America.

The Bibliography is designed to provide information on fisheries programs, projects and research in newly developing countries. It includes a general section on such topics as fish processing, protein concentrates, marketing, research and training as well as regional sections which cover a variety of surveys and reports of many aspects of fisheries activities in individual countries in Africa, Asia and Latin America. Annotations are descriptive of content and include author, title, source of publication and identifying number.

**PB-212 288** **PC A04/MF A01**

Agency for International Development, Washington, D.C. Office of Science and Technology.  
**Appropriate Technologies for International Development. Preliminary Survey of Research Activities**  
 Sep 72, 65p Rept no. TA/OST-72-11

Descriptors: \*Economic development, \*Developing countries, \*Research, Developing countries, Utilization, Corporations, Capital, Design, Systems engineering, Industries.  
 Identifiers: \*Technology, Transfer of technology.

Three papers make up the report. The first paper, 'The Role of the Research Institute in Industrial Growth', is based on observations of industrial research institutes in developing countries. The second paper describes 'Research Interests of Foreign Assistance Agencies Concerning Appropriate Technology'. The third, 'Multinational Corporations and Adaptive Research for Developing Countries', attempts to describe selected types of activities of multinational corporations as illustrative of their involvement and interest in technological development of developing countries. (Author)

**PB-212 359** **PC-GPO/MF A01-NTIS**

Clemson Univ., S.C. Dept. of Textiles.  
**State of the Art of Textile Waste Treatment**  
 Water pollution control research series rept.  
 Feb 71, 356p EPA-WQO-12090-ECS-02/71  
 Paper copy available from GPO \$2.50 as EP2.10:12090-ECS-02/71.

Descriptors: \*Textile industry, \*Industrial waste treatment, \*Water pollution, \*Industrial wastes, Reviews, Bibliographies, Inventories, Synthetic fibers, Natural fibers, Lagoons(Ponds), Activated sludge process, Trickling filtration, Detergents, Dyes, Sludge disposal, Industrial engineering, Cost estimates, Legislation, State government, Government policies, Textile finishing, Sizing materials, Cotton fabrics, Woolen textiles, Rayon, Acetate fibers, Polyester fibers, Acrylic fibers, Public law.  
 Identifiers: \*Water pollution control, Biological industrial waste treatment, Tertiary sewage treatment, Water pollution abatement.

A study has been made of waste treatment methods and practices used in the textile industry. Information was obtained from people working in the textile processing industry, designing waste treatment plants, and enforcing state and federal regulations on waters discharged to streams and natural reservoirs. To supplement this information the literature was reviewed and an annotated bibliography prepared. The report contains sections on the following: characteristics of textile waste,



waste treatment techniques, treatment methods in use, effects of textile wastes on receiving waters, the cost of waste treatment operations, and state and federal regulations governing discharge waters. Areas of needed research are recommended. The annotated bibliography contains references on synthetic fiber manufacturing wastes, detergent waste treatment, instrumentation, plant design, water treatment for plant use as well as articles pertaining specifically to textile waste treatment.

**PB-212 371** PC A06/MF A01  
Agency for International Development, Manila (Philippines).  
**Housing and Urban Development in the Philippines**  
Bernard Wagner. Jan 68, 101p TA/OST-AN-68-1-2

Descriptors: \*Residential buildings, \*Project planning, \*Urban development, \*Philippines, Developing countries, Reviews, Problem solving, Requirements, Organizations, Management.  
Identifiers: Low income groups, Middle income groups.

The document contains a series of papers on housing and urban development problems in the Philippines. Topics included are housing needs and a proposed action program, urban development in Mindanao, reorganization of the home financing commission, modification of the administration of housing and urban programs, the squatter problem, urban planning in the Iligan area, housing of middle and lower income groups, housing investment by insurance companies, and comments on the Draft Administrative Code.

**PB-212 372** PC A03/MF A01  
Agency for International Development, Washington, D.C.  
**Leader Training for Aided Self-Help Housing**  
Jun 69, 40p Rept no. TA/OST-AN-69-6-8

Descriptors: \*Residential buildings, Developing countries, \*Construction, Manuals, \*Leadership, Specialized training, Project planning, Evaluation, Production engineering, Socioeconomic status, Problem solving, Methodology, Recommendations, Reviews.  
Identifiers: Self help housing, \*Aided self help housing, Low cost housing, \*Leader training.

Aided self-help housing is described as a natural way to better homes in the less industrialized areas of the world, can often be reached most effectively through trained local leaders. It is the purpose of this manual to present material useful for conducting a course for such local leaders. The following topics are included: Advantages and disadvantages of this technique for producing homes; examples and case studies demonstrating how aided projects have been carried out by others; various planning principles affecting aided self-help housing; development of skills in construction techniques; material, labor, and financial resources; problems of communicating ideas for low cost housing; and proposals for initiating an aided self-help housing program.

**PB-212 398** PC A08/MF A01  
Humboldt County Dept. of Public Works, Eureka, Calif.  
**Rural Storage and Collection Container Systems**  
Interim rept. 1 Jun 70-31 Oct 71.  
1972, 155p EPA-SW-41D.1-72  
Grant G06-EC-00271  
Prepared in cooperation with Garretson-Elmendorf-Zinov-Reibin, Consultants.

Descriptors: \*Refuse disposal, \*Containers, Storage, Project planning, Rural areas, Collecting methods, Earth fills, Cost analysis, California.  
Identifiers: \*Solids waste disposal, Humboldt County(California).

The objective of the project was to demonstrate and evaluate two alternative refuse storage and collection container systems for small isolated rural areas, with special emphasis on costs, workability, and community acceptance. The test area

for the project is to be the southern one-third of Humboldt County, California, with a population of approximately 10,000 people. In the first system, waste will be deposited in a 40-cu-yd, roll-off container that can be picked up and hauled to the central sanitary landfill. In the second system, waste will be deposited in 8-cu-yd containers. These containers will be emptied at the site into a 42-cu-yd collection vehicle that will then proceed to the next container site or, if full, to the landfill. The interim report details the selection of collection equipment (both containers and vehicles) components, and the development of test procedures for evaluating the storage and collection systems.

**PB-212 632** PC A17/MF A01  
Miner (Thomas H.) and Associates, Inc., Chicago, Ill.  
**Industrial Development and Feasibility Study. Pulp and Paper Manufacturing in South Vietnam. Book I**  
Apr 70, 382p TA/OST-AN-70-4-1  
Contract AID/VN-54  
See also Book 2, PB-212 633.

Descriptors: \*Pulp mills, South Vietnam, \*Paper industry, \*South Vietnam, Feasibility, Developing countries, Market research, Expenses.

Vietnam has a variety of fiber resources which in total constitute an adequate raw material for a pulp and paper industry. The present paper industry was built with only the domestic market in mind, and currently it is entirely dependent on import of pulp. Under these circumstances of small size and imported raw material, the paper industry in Vietnam suffers from high costs. This study examines the feasibility of developing a viable pulp and paper industry in Vietnam in the early post-war period. The scope of the study includes: A review of the existing industry, including facilities, capacities, capabilities, and cost factors; a survey of present and possible future markets, both domestic and in neighboring Southeast Asian countries; a survey of indigenous fibrous raw materials, including types, amounts available, location, and cost; a proposal of location, number, type, and capacity of new facilities; and a calculation of grade costs, net realization, and financial soundness of the proposed facilities.

**PB-212 633** PC A14/MF A01  
Miner (Thomas H.) and Associates, Inc., Chicago, Ill.  
**Industrial Development and Feasibility Study. Pulp and Paper Manufacturing in South Vietnam. Book II**  
Apr 70, 310p TA/OST-AN-70-4-2  
Contract AID/VN-54  
See also Book 1, PB-212 632.

Descriptors: \*Pulp mills, South Vietnam, \*Paper industry, \*South Vietnam, Feasibility, Developing countries, Market research, Expenses.

The volume is comprised of appendices intended to accompany Book I of this study. The topics covered include: Marketing prospects for export; raw materials for a proposed kraft mill near Dalat; methods, equipment, and estimated costs for bamboo extraction at Phuoc Binh; summary of U. S. Forest Products Laboratory tests; materials, supplies, and unit costs; summary of corporate taxation and exemptions; core making plant; bamboo harvesting report; bagasse report; 250 ton integrated kraft mill.

**PB-212 726** PC A05/MF A01  
Agency for International Development, Washington, D.C. Office of Science and Technology.  
**Forestry in Developing Countries. Potentials, Constraints, and Opportunities**  
Gordon D. Fox. Oct 72, 76p Rept no. TA/OST-72-12

Descriptors: \*Forestry, \*Developing countries, Forest trees, Economic development, Wood products, Structural timber, Reforestation, Utilization, Transportation, Research, Management.

With about one-half of the world's forest area located in the developing countries, adequate forest programs to manage and exploit this renewable

natural resource are an important aspect in economic development. This preliminary analysis focuses on the following issues: principal factors inhibiting better management of forest resources; technical aspects of these inhibiting factors; practical steps that might overcome these problems; and likely impact on timber resources and utilization if such steps were taken.

**PB-212 748** PC A03/MF A01  
Yale Univ., New Haven, Conn. Economic Growth Center.  
**The Role of the Industrial Sector In Korea's Transition to Economic Maturity**  
Gustav Ranis. Oct 71, 37p EGC-DP-125, TA/OST AN-71-10-4  
Contract AID/csd-2492

Descriptors: \*South Korea, \*Economic development, \*Industries, South Korea, Developing countries, Economic analysis, Unskilled workers, Japan, Taiwan.

Korea belongs to the category of developing country which have small, therefore open, labor surplus dualistic economies, characterized by a relative lack of natural resources and an abundance of unskilled labor at the outset. This paper begins with a definition of the 'ideal' growth pattern for this type of economy. A review is then provided of the actual Korean experience relative to this ideal. Korean performance in this respect is contrasted to two other countries belonging to the same family; i.e. Japan, historically, and Taiwan in the post-war period. Consideration is given to the initial conditions and to the similarities and differences of the transition processes in the countries. Finally, the implications of this analysis with respect to further research and policy are discussed.

**PB-212 749** PC A04/MF A01  
Harvard Univ., Cambridge, Mass. Center for International Affairs.  
**Equitable Distribution of Benefits In integration Schemes Among the Less Developed Countries: The Andean Group**  
David Morawetz. Apr 72, 67p Economic Development-216, TA/OST AN-72-4-3  
Contract AID/cds-1543

Descriptors: \*Economic development, Treaties, \*Developing countries, \*Distribution systems, Commerce, Inequalities, Agreements, Economic analysis, Bolivia, Chile, Colombia, Ecuador, Peru. Identifiers: \*Economic integration, Andean Group customs union.

All economic integration schemes among less developed countries which have been established to date have foundered on the problem of how to equitably distribute the benefits arising from the existence of the scheme. The Cartagena Agreement of the Andean Group customs union (Bolivia, Chile, Colombia, Ecuador, and Peru) includes several measures bearing on this problem. The paper provides a theoretical analysis of the benefit distribution problem, and an evaluation of the benefit distribution provisions of the Cartagena Agreement. Consideration is given to the definition of an 'Equitable' benefit distribution, some problems in measuring net benefits, and the presumptions as to whether benefits are likely to be equally or unequally distributed in integration schemes. A number of schemes which have been proposed and/or adopted to achieve equitable benefit distribution are then examined from a theoretical viewpoint. The measures contained in the Cartagena Agreement are analyzed in the light of this examination, and of the experience of other integration schemes with the benefit distribution problem.

**PB-212 779/3** PC A06/MF A01  
Nathan (Robert R.), Associates, Inc., Washington, D.C.  
**An Evaluation of Recent Private Industrial Development in Nicaragua**  
Jan 71, 109p TA/OST-AN-71-1-1  
Contract AID/La-650

Descriptors: \*Industrial development, Nicaragua, \*Economic development, \*Nicaragua, \*Foreign aid, \*Financing, Developing countries, Industries, Investments, Capital.



Identifiers: Small businesses.

In the mid-1960's, the Agency for International Development decided that the Nicaraguan industrial sector needed access to investment capital to finance a backlog of projects. AID met this need by making \$17 million available to create and strengthen intermediate credit institutions to mobilize capital, both foreign and domestic. This report provides an assessment of the efficacy of the AID programs to the private industrial sector of Nicaragua and suggests changes that might improve them. Specifically, consideration is given to the following: Past rate of growth; prospects for industry in Nicaragua; strategic factors in industrial expansion; shortage for working capital and the debt/equity problems; cost of AID capital; investment climate in the industrial sector; aid contribution to meeting long-term capital needs; strengthening the capacity of the National Development Institute (INFONAC); creation of a new private investment bank; AID loan program as a stimulant to domestic savings; loans to small businesses and artisans; providing technical assistance; performance and impact of the industrial sector in recent years.

**PB-212 784/3** **PC A16/MF A01**  
Agency for International Development, Washington, D.C. Office of Program and Policy Coordination.  
**A Firsthand Study of Industrial Management and Economic Development in India**  
Dec 69, 368p TA/OST-AN-69-12-1

Descriptors: \*Industrial management, \*India, \*Economic development, India, Developing countries, Management, Environments, Benefit cost analysis.  
Identifiers: Transfer of technology.

The document represents an effort to develop guidelines that can serve as a basis for effective action by managements of individual Indian enterprises in their attempts to adapt to and reduce the impact of negative environmental conditions on their performance. It also seeks to determine the extent to which managerial practices, techniques, concepts, policies, principles, and general know-how which tend to be effective on a relatively widespread scale in U. S. industry can be transferred and/or applied successfully to a developing country such as India. Consideration is given to the costs and benefits involved in the transference process, and to the degree that the Indian environment seriously constrains or prevents such transference. In addition, attention is given to the development of guidelines and meaningful priorities that indicate what action might best be taken by public authorities in dealing with environmental constraints which seriously hinder managerial performance and productive efficiency at industrial enterprises.

**PB-212 916/1** **PC A20/MF A01**  
Stanford Research Inst., Menlo Park, Calif.  
**Costs of Urban Infrastructure for Industry as Related to City Size in Developing Countries. India Case Study**  
Om Prakash Mathur, Richard Morse, and M. C. K. Swamy. Oct 68, 453p TA/OST-AN-68-10-2  
Contract AID/csd-802  
Prepared in cooperation with School of Planning and Architecture, New Delhi, India, and Small Industry Extension Training Institute, Hyderabad, India.

Descriptors: \*Urban development, \*India, \*Industries, \*Economic development, Benefit cost analysis, Developing countries, Municipalities, Magnitude, Populations.  
Identifiers: \*Industrial development, Urban infrastructure.

The document provides the details of a study which was designed to measure the direct costs of equipping cities of different size for industrial development, including the costs of social infrastructure for new urban industrial employees and their families. It is orientated primarily to the situation in developing economics and is centered on the industrial growth requirements of selected cities in the states of Punjab, Haryana, and Uttar Pradesh, in northern India. An examination is made of the widely held belief that unit costs of incremental in-

frastructure for new industry tend to be relatively high in smaller cities, to decrease over some intermediate range of city sizes, and to rise significantly beyond some large city size. Consideration is given to both the effect of city size on costs, and to the combined effect of costs when composition of industry varies with city size.

**PB-212 941/9** **MF A01**  
National Academy of Sciences, Washington, D.C.  
**Genetic Vulnerability of Major Crops**  
1972, 315p  
International Standard book no. 0-309-02030-1. Library of Congress catalog card no. 72-77533. Sponsored in part by Research Corp. of New York and the Department of Agriculture, Washington, D. C.  
Paper copy available from National Academy of Sciences, 2101 Constitution Ave., Washington, D. C. 20418, \$7.50.

Descriptors: \*Plant genetics, \*Plant diseases, \*Farm crops, Plant genetics, Fungus diseases, Plant pathology, Epidemiology, Corn plants, Wheat plants, Rice plants, Leguminous plants, Soybean plants, Cotton plants, Vegetable crops, Economic analysis.  
Identifiers: Corn blight.

The report provides the scientific community and the general public with a description of the circumstances surrounding the 1970 corn blight epidemic, and assessment of the genetic bases of other food and fiber crops, and an evaluation of their potential susceptibility to severe epidemics. This informative study presents the views of plant breeders and pathologists, geneticists, entomologists, plant physiologists, economists, and investigators knowledgeable in the production of major crops. These experts suggest ways to deal with the challenges that genetic uniformity in crops pose to the scientific community and the nation.

**PB-212 974/0** **MF A01**  
National Academy of Sciences, Washington, D.C.  
**Soils of the Humid Tropics**  
Jun 72, 229p  
Library of Congress Catalog Card no. 78-189475. International Standard Book No. 0-309-01948-6.  
Paper copy available from the National Academy of Sciences, Printing and Publishing Office, 2101 Constitution Ave., N. W., Washington, D. C. 20418. PC\$7.95.

Descriptors: \*Soils, Tropical regions, Arable land, Soil surveys, Mapping, Soil structure, Soil classification, Fertilizers, Porosity, Soil chemistry, PH, Cation exchanging, Soil fertility, Aluminum, Potassium inorganic compounds, Phosphorus inorganic acids, Sulfur oxides, Silicon dioxide, Manganese, Latin America.

Throughout the world there are approximately 1.6 billion hectares of potentially arable land that is not now under cultivation. Half of this uncultivated land lies in the tropics where climatic and soil conditions offer a high potential for crop production. If only 2 percent of this land could be cultivated under modern technological principles, enough food would be produced to feed the current population of Latin America. A committee of soil scientists under the auspices of the Agricultural Board of the National Research Council has prepared Soils of the Humid Tropics, a report that identifies research priorities and offers recommendations for better use of this agricultural resource. (Author)

**PB-212 975/8** **MF A01**  
National Academy of Sciences, Washington, D.C.  
**International Marine Science Affairs**  
Feb 72, 103p  
Library of Congress Catalog Card no. 74-183584. International Standard Book no. 0-309-01937-0.  
Paper copy available from the National Academy of Sciences, Printing and Publishing Office, 2101 Constitution Ave., N.W., Washington, D.C. 20418. PC\$4.75.

Descriptors: \*Oceans, \*International relations, Recommendations, Research management, Organizations, Government policies, Developing countries, United States, Oceanography, Fisheries, In-

formation systems, Metrology, Meteorology, International law, Foreign policy.  
Identifiers: United Nations.

The report deals with the heightened stress and political conflict that arise as governmental institutions adapt to new requirements for maintaining order among the variety of ocean uses and users. The purpose of the report is to examine these national and international political institutions in terms of their appropriateness to the goals of wise, effective, and equitable ocean use. Recommendations are also offered to suggest various means to achieve these goals. (Author)

**PB-213 023/5** **PC A03/MF A01**  
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.  
**A Universal Solar Kitchen**  
C. J. Swet. Jul 72, 27p\* Rept no. APL/JHU-CP-018

Descriptors: \*Kitchen equipment and supplies, \*Solar energy, Solar radiation, Cooking devices, Water heaters, Cost, Performance(Engineering), Tracking(Position), Heat transfer, Convection.  
Identifiers: \*Solar kitchens.

The widespread domestic use of solar energy would significantly reduce air pollution and conserve vital resources, especially in populous developing regions where many families burn foraged firewood, vegetable waste, or dung. However, currently available solar cookers, ovens, and water heaters have failed to gain general acceptance where they are needed most, mainly because of their limited utility and poor compatibility with traditional life styles. Recent studies indicate that these shortcomings can be largely removed by innovative applications of existing technology. It now appears possible to produce at reasonable cost a universal solar kitchen that can satisfy most of the usual domestic requirements for thermal energy. The basic design is adaptable to a wide variety of ethnic and regional domestic practices, is readily transportable, and requires no special skills for installation or use. A conceptual approach to the design of universal solar kitchens is presented, with nonrigorous indications of feasibility, performance, producibility, and cost. Two possible embodiments are described, with primary emphasis on the collection of the solar energy and its delivery to a convenient point of use or storage. (Author)

**PB-213 181/1** **PC A05/MF A01**  
Puerto Rico Univ., Mayaguez. Water Resources Research Inst.  
**Determination of the Rate of Biodegradation in Some Polluted Tropical Waters and in Some Types of Liquid Wastes Common in Puerto Rico**  
Completion rept.  
Luis A. del Valle. Sep 72, 85p OWRR-A-023-PR(1)

Descriptors: \*Puerto Rico, Water pollution, \*Biochemical oxygen demand, Tropical regions, \*Water pollution, Biochemical oxygen demand, Sewage, Biodeterioration, Industrial wastes, Reaction kinetics, Temperature, Computer programs.  
Identifiers: Sewage treatment effluent.

The first part of the study evaluates methods for the determination of deoxygenation (biodegradation) rates of polluted waters in Puerto Rico. The experimental part of the study was divided into three phases. The first phase consisted in working with the waste as it came from the particular source to determine its value of K (biodegradation constant) in its original state. The second and third phases of the study consisted in diluting the waste with natural river and sea water to simulate the condition of the waste when discharged into a natural body of water. The degree of dilution does not seem to have any significant effect. On the other hand, when the dilution water is sea water the value of K tends to be higher than when the waste is diluted in fresh water. (Author)

**PB-213 372/6** **PC-GPO/MF A01-NTIS**  
Environmental Protection Agency, Rockville, Md. Solid Waste Management Office.



## APPROPRIATE TECHNOLOGY ABSTRACTS

### **Financing Solid Waste Management in Small Communities**

1972, 16p Rept no. EPA-SW-57ts  
Paper copy also available from GPO \$0.25 as stock no. 5502-0022.

Descriptors: \*Waste disposal, \*Financing, Urban planning, Communities, Management planning, Local government, Leasing.  
Identifiers: \*Bond issues, \*Solid waste disposal.

The paper discusses the three major financing techniques (pay-as-you-go, leasing, and long-term borrowing) as they apply to solid waste disposal in small communities. More indirect methods, such as private contracting or grants utilization, are not considered.

### **PB-213 442/7 PC A05/MF A01**

Southwest Research Inst., San Antonio, Tex.

#### **Impregnation of Concrete Pipe**

Jun 71, 78p EPA-11024-EQE-06/71

Contract EPA-14-12-835

Paper copy available from GPO \$0.75, as stock no. 5501-0601. EP2.10:11024-EQE-06/71.

Descriptors: \*Concrete pipes, Impregnating, \*Corrosion prevention, Concrete pipes, Sewers, Permeability, Polymers, Coal tar, Linseed oil, Sulfur, Urea, Formaldehyde, Exposure.

The program was undertaken to investigate methods to increase the corrosion resistance, increase the strength, and reduce the permeability of concrete used in sewer line applications by impregnating the concrete pipe with relatively low cost resins such as asphalt, coal tars, linseed oil, sulfur, urea-formaldehyde, and others. Methods to accomplish this end were achieved and the materials, techniques of application, test results and economics are presented in this report. (Author)

### **PB-213 492/2 PC-GPO/MF A01-NTIS**

Environmental Protection Agency, Rockville, Md. Solid Waste Management Office.

#### **An Accounting System for Solid Waste Management in Small Communities**

Eric R. Zausner. 1971, 21p Rept no. EPA-SW-28ts

Library of Congress Catalog Card no. 78-611564. Paper copy available from GPO \$0.30 as stock no. 5502-0021, EP3.2:AC2.

Descriptors: \*Waste disposal, \*Accounting, Cost analysis, Management planning, Benefit cost analysis, Collecting methods, Data acquisition, Information systems, Urban planning, Communities, Forms(Paper).  
Identifiers: \*Solid waste disposal, Management information systems.

The increasing costs and complexities of solid waste collection and disposal require new, more sophisticated management techniques. Although cost accounting represents only one part of the total information system, its design, installation, and utilization can represent a significant step in the development of effective solid waste management. The proposed system provides a guide to the type and quantity of information to be collected, its classification, and the method of collection. The system described is designed primarily for small communities (<25,000) that collect and dispose of the solid wastes generated in their jurisdiction. The system was specifically designed to be effective for packer-truck collection and landfill disposal operations.

### **PB-213 537/5 PC-GPO/MF A01-NTIS**

Metropolitan Sanitary District of Greater Chicago, Ill.

#### **Agricultural Benefits and Environmental Changes Resulting from the Use of Digested Sewage Sludge on Field Crops**

Interim rept.

T. D. Hinesly, O. C. Braids, and J. E. Molina.

1971, 73p

Grant G06-EC-00080

Prepared in cooperation with Illinois Univ., Urbana. Paper copy available from GPO \$0.65 as EP3.2:AG8.

Descriptors: \*Sludge disposal, \*Irrigation, \*Fertilizing, Sludge disposal, Plant growth, Performance

evaluation, Lysimeters, Farm crops, Trace elements, Soil chemistry, Nutrients.

Identifiers: \*Sewage irrigation, Liquid waste disposal.

The project studied involved the possible agricultural benefits and environmental changes that would result from applying digested sewage sludge liquid to field crops. In addition, criteria are developed that can be used in selecting sites for this method of sludge disposal. The report discusses the progress made after three year's work. Since agronomic field studies require a minimum of three years to integrate seasonal effects with measured parameters, the longer the duration of a field study, the greater the confidence level of the results. Therefore, only one year of data--detailed climatic measurements, runoff and drain water analyses, and sludge applications--were collected from a lysimeter facility.

### **PB-213 594/6 PC A05/MF A01**

Texas A and M Univ., College Station.

#### **Development of a Scientific Basis for the Manufacture of Low-Cost Protein Foods and Beverages from Fresh Coconuts**

Final rept.

Karl F. Mattil. 1 Sep 70, 77p\* TA/OST-AN-70-9-3

Contract PIO/T 931-11-190-864, PIO/T-73-

3192010

Descriptors: \*Nuts(Fruits), \*Proteins, \*Food processing, Nuts(Fruits), Fruits, Nutritive value, Developing countries.

Identifiers: \*Coconuts.

Coconuts represent a potential new indigenous protein source in the coconut producing countries of the world. This report provides the results of an effort to generate fundamental scientific and technological information basic to the practical exploitation of this protein source, and to evaluate the state of the art of processing fresh coconuts for food use. The evaluation is based on both a survey of the literature and personal contacts with those involved with research and development efforts. Results of basic investigations in the following areas are reported: The ultrastructure of coconut meats; physical processing methods for maximum extraction of fat and protein; the amount of heat treatment coconut meat and meal can tolerate without adverse effects on product quality; identification of major classes of protein in coconut meats; characteristics of each class of protein.

### **PB-213 612/5 PC A17/MF A01**

Department of Health, Education and Welfare, Washington, D.C.

#### **A Selected Bibliography on African Foods and Nutrition. Arranged According to Subject Matter and Area**

Woot-Tsuen Wu Leung, and Ritva Rauanheimo

Butrum. Dec 70, 391p\* TA/OST-AN-70-12-5

Prepared in cooperation with Food and Agriculture Organization of the United Nations, Rome (Italy).

Descriptors: \*Food, \*Africa, \*Developing countries, \*Nutrition, \*Bibliographies, Food, Human nutrition, Plants(Botany), Diets, Food composition, Food habits, Food industry, Education.  
Identifiers: \*African foods.

The bibliography is comprised of references to the world's literature, published in the 1940-1969 time period, dealing with the subject of food and nutrition in Africa. The entries are arranged by country and, within each country, according to general subject (general studies, food resources, food composition, food supplements, food technology, food habits, nutrition and dietary surveys, nutritional status, and nutrition education). A selected bibliography on African botanical nomenclature is appended.

### **PB-213 756/5 PC A10/MF A01**

Kansas State Univ., Manhattan. Food and Feed Grain Inst.

#### **Improving the Nutritive Value of Cereal Based Foods**

Annual progress rept. no. 3, Jan-Dec 70.

Jun 71, 217p TA/OST-AN-71-6-5

Contract AID/csd-1586

Descriptors: \*Cereal products, \*Nutritive value, \*Food processing, Cereal products, \*Developing countries, Food processing, Proteins, Soybeans, Peas, Beans, Flours(Food), Bread, Evaluation, Nutrition, Pakistan, Africa.

Identifiers: Food fortification, Organoleptic evaluation.

The document describes the activities and accomplishments of an ongoing project which has as its overall objective the improvement of the nutritional value of cereal-based food in North Africa and Pakistan by supplementation and process modification without decreasing the food acceptability to the general consuming public in those areas. Research effort focused on the use of three protein sources: soy flour, chick-pea flour, and horse bean flour. These were used for food fortification. Emphasis was given to the nutritional and organoleptic evaluations of chapatis, couscous, and Moroccan bread fortified with the high protein flours. (Author)

### **PB-213 758/3 PC A06/MF A01**

New York State Agricultural Experiment Station, Geneva.

#### **Development of Soy-Based Foods of High Nutritive Value for Use in the Philippines**

W. B. Robinson, M. C. Bourne, and K. H.

Steinkraus. Jan 71, 106p TA/OST-AN-71-1-2

Contract AID/csd-1815

Descriptors: \*Soybeans, \*Food processing, \*Food, Philippines, Nutritive value, Proteins, Flavor, Economic analysis, Developing countries.

Results are given of a research program which was undertaken to develop processes for manufacturing soy-based foods on a scale and of a simplicity appropriate to the socio-economic requirements of relatively small population centers in countries such as the Philippines. Flavor, acceptability, economy, and nutritional value were of primary concern. The report describes research conducted in the following areas: Development of a simple procedure for manufacture of a bland soy beverage and other products that could be easily produced without the use of elaborate and expensive equipment; introduction of the soy beverage to selected groups of Philippine school children; engineering studies on unit operations in soy product manufacturing; nutritional evaluation of the products and the nutritional effects of the unit processes involved; basic laboratory research on physical and chemical qualities of soy products and components to lay a scientific basis for improvement of the products and unit processes involved in their manufacture.

### **PB-213 764/5 PC A06/MF A01**

Agency for International Development, Washington, D.C. Office of Nutrition.

#### **Improving the Nutrient Quality for Cereals. Report of Workshop on Breeding and Fortification. Held at Annapolis, Maryland, 7-9 December 1970**

Jun 71, 107p TA/OST-AN-71-6-6

Descriptors: \*Grains(Foods), Developing countries, \*Cereal products, Food processing, Meetings, Plant genetics, Quality, Human nutrition.  
Identifiers: \*Food fortification.

There is a great potential for effecting improvement in diet through the breeding of higher protein content and quality in staples and through fortification of such staples during the milling process. The report presents papers from a Seminar on Breeding and Fortification held at Annapolis, Maryland from December 7-9, 1970. The papers concern progress, problems and potential for the improvement of various crops, including wheat, rice, corn, sorghum and millet. Recommendations are given for future operations and research.

### **PB-213 766/3 PC A02/MF A01**

League for International Food Education, Washington, D.C.

#### **The Food Industry in Asia, Its Potential for Providing Low Cost Nutritious Foods. Proceedings of Singapore Workshop, 1-5 November 1971**

Summary rept.



# APPROPRIATE TECHNOLOGY ABSTRACTS

Nov 71, 24p TA/OST-AN-71-11-2

Descriptors: \*Food industry, \*Asia, \*Developing countries, Food industry, Economic development, Human nutrition, Cost factors, Food processing, Meetings.

The Singapore Workshop was convened to provide a forum where Asian private food industry businessmen could discuss the potential of the food industry for providing low cost nutritious foods. This report summarizes the discussions of these businessmen during the week-long meeting. Special emphasis is given to the constraints which were identified as being the ones which hinder the progress of low-cost nutritious foods. Equivalent emphasis is also given to the recommendations for action which the participants felt could help overcome these constraints.

**PB-213 769/0** PC A03/MF A01  
Kansas State Univ., Manhattan. Food and Feed Grain Inst.  
**Improving the Nutritive Value of Cereal Based Foods**  
Annual progress rept. no. 4, Jan-Dec 71.  
1 Jun 72, 37p TA/OST-AN-72-6-1  
Contract AID-csd-1586

Descriptors: \*Cereal products, \*Nutritive value, \*Food processing, Cereal products, \*Developing countries, Food processing, Proteins, Soybeans, Peas, Flours(Food), Bread, Evaluation, Nutrition, Pakistan, Africa.  
Identifiers: Food fortification, Organoleptic evaluation, Protein fortified foods.

A review is presented of research to improve the nutritional value of cereal based foods in North Africa and Pakistan by supplementation and process modification without decreasing the food acceptability to the consumers in those areas. The foods considered were protein fortified wheat based bread, chapatis, and couscous using soy flour, chickpea flour, and broadbean flour. The fortified foods met the nutritive guidelines established by the project and prove acceptable to small consumer panels. Many other protein resource materials were evaluated. A system of developing and evaluating protein fortified foods was evolved. (Author)

**PB-213 787/8** PC A04/MF A01  
Massachusetts Inst. of Tech., Cambridge. Dept. of Nutrition and Food Science.  
**Extending Protein Concentrates for Child Feeding by Addition of Inexpensive Simple Nitrogen Sources**  
Final rept.  
Nevin S. Scrimshaw. Oct 71, 63p TA/OST-AN-71-10-5  
Contract AID/csd-1441

Descriptors: \*Food additives, Milk, \*Nitrogen, Food additives, \*Milk, \*Proteins, Amino acids, Nutrition, Children.

A series of studies has been undertaken to determine the extent to which the concentration of essential amino acids in dried milk can be extended by the addition of non-specific nitrogen without influencing the nutritional value of the protein. The results of the studies, which were conducted in children and young men, are summarized in this report. The non-specific nitrogen source used was a mixture of glycine and diammonium citrate. The results support the conclusion that at any time that it is necessary to extend the 'protein' content of milk supplies for the supplementary feeding of population groups, inexpensive non-specific nitrogen sources may be used to an extent of at least 10% without impairing the ability of the milk to meet any normal protein needs.

**PB-213 794/9** PC A14/MF A01  
Kasetsart Univ., Bangkok (Thailand). Inst. of Food Research and Product Development.  
**Report on Protein Food Development Project, 1969-1971**  
Amara Bhumiratanana, and Amorn Nondasuta.  
1971, 302p TA/OST-AN-71-13-2

Prepared in cooperation with the Health Dept., Bangkok (Thailand). Nutrition Div. Text in English and Thai.

Descriptors: \*Proteins, \*Food processing, Nutrition, Children, Diets, Developing countries, Thailand.

The document reports the activities and accomplishments of a project which was instituted to improve the nutritional conditions in Thailand. The principal objectives were: To promote development in food technology and related fields; to develop high-protein food supplements for infants and preschool children; to test new products for suitability and acceptability by consumers; and to promote new products on a commercial scale in an effort to increase consumption among the people. The information provided includes: The results of field trials of protein food prototypes; chemical and biological assays; flowcharts for the production of various protein foods; protein food promotion efforts; protein-enriched menus for school children, including recipes for their preparation.

**PB-214 120/8** PC A02/MF A01  
Delaware Univ., Newark. Water Resources Center.  
**Water Use Efficiency of Vegetable Crops Given over Asphalt Moisture Barriers**  
Technical research project completion rept.  
Ernest N. Scarborough, and William C. Liebhardt.  
Dec 72, 15p W73-03907  
Contract DI-14-31-0001-3008, DI-14-31-0001-3208  
Sponsored in part by Research contract DI-14-31-0001-3508.

Descriptors: \*Soil moisture, \*Barrier materials, \*Water consumption, \*Vegetable crops, Asphalts, Efficiency, Nitrogen inorganic compounds, Sands, Leaching, Yield, Productivity, Rainfall, Delaware.  
Identifiers: Asphalt moisture barriers, Water use.

The effectiveness of a subsurface asphalt moisture barrier in increasing yields of vegetable crops grown on loamy sand soils was investigated. Six vegetable crops were grown under conditions of irrigation and no irrigation with and without a barrier. Average yield increases of all crops over the barrier without irrigation were 46%, 58% and 55% for 1967, 1968 and 1969 respectively. With irrigation, yield increases were 35%, 16% and 30% for 1967, 1968 and 1969. Yield increases were due to a combination of increased water retention and a reduction in nitrate leaching due to excessive rainfall. The barrier increased the water holding capacity of the soil in top 2 feet by approximately 1.25 inches or an additional 70% in available water. In laboratory leaching studies with simulated barriers using high rates of nitrogen, 2 1/2 times as much nitrate remained in the top 2 feet of the soil compared to no barrier with a 5 inch application of water. A summary of yields by crop and graphs of the movement of nitrate, ammonium and potassium are included. The asphalt moisture barrier has proven to be an effective production practice with sandy soils where irrigation is not feasible. (Author)

**PB-214 172/9** PC A14/MF A01  
Arizona Univ., Tucson. Inst. of Arid Lands Research.  
**Salinity Problems in Arid Lands Irrigation: A Literature Review and Selected Bibliography**  
Information paper no. 1  
Hugh E. Casey. 1972, 311p\* WRSIC-73-300  
Grant DI-14-01-0001-1616

Descriptors: \*Bibliographies, Irrigation, \*Arid lands, Irrigation, \*Irrigation, Salinity, Water quality, Land reclamation, Drainage, Watersheds, Leaching, Water rights, Soil moisture, Droughts, Salt water, Greenhouses, Reviews, Irrigated land.  
Identifiers: Colorado River Basin.

A bibliography of 986 references with accompanying text that reviews broadly such topics as water quality and the total drainage basin, salinity prevention and soil reclamation, salinity and drought effects on plants, soil and water salts, basic water balance problems in relation to irrigation, plus a perspective on historic salinity problems and an overview. Socioeconomic aspects are considered, with reference to the Colorado River basin as an

example in microcosm. There is discussion of currently used and potential ameliorative techniques that would render current methods more efficient, raise productivity enough to constitute a breakthrough, and high-humidity low water-use greenhouse structures that would radically alter current arid lands irrigation methods. (Author)

**PB-214 173/7** PC-GPO/MF A01-NTIS  
Council on Environmental Quality, Washington, D.C.  
**Integrated Pest Management**  
Nov 72, 51p  
Paper copy available from GPO \$0.55 as stock no. 411-0010.

Descriptors: \*Agriculture, \*Pest control, Pesticides, Ecology, Genetics, Plants(Botany), Breeding, Microbiology, Parasitology.  
Identifiers: Biological pest control.

A detailed description of the integrated pest management approach, its stage of development, and the federal effort being initiated to promote its further development and use. It is the result of a CEQ study to define positive approaches in alleviating the problems now being encountered with some agricultural pest control practices.

**PB-214 175/2** PC A05/MF A01  
Self-Help Enterprises, Inc., Visalia, Calif.  
**The Bravo Story**  
Final rept.  
Robert Marshall. 1 Mar 72, 88p\*  
Grant HUD-H-1451

Descriptors: \*Regional planning, \*California, \*Residential buildings, Social welfare, Construction, Concepts, Legislation, Urban planning, Methodology, Services, Manpower utilization, Specialized training, Financing.  
Identifiers: \*Bravo Industries, San Joaquin Valley, Low cost housing, \*Self help housing, \*Disadvantaged groups, \*Migrant workers, \*Seasonal farm workers.

Bravo Industries is the story of a concept and of the effort made by Self-Help Enterprises, Inc. (SHE) to fulfill its basic mandate of assisting migrant and seasonal farmworkers and their families to improve their living conditions and develop the necessary skills to maintain a productive and self-sufficient life. Bravo is also the story of an organizational structure designed to develop new techniques and methods for meeting the immediate and pressing needs of predominantly farmworkers families for improved housing and sanitation in the face of changing demands in agricultural employment.

**PB-214 271/9** PC A02/MF A01  
Bureau of Mines, Washington, D.C.  
**Waste Glass as a Flux for Brick Clays**  
Research rept. 1971-72  
M. E. Tyrrell, and Alan H. Goode. Dec 72, 14p\*  
Rept no. BuMines-RI-7701  
Prepared in cooperation with Tuscaloosa Metallurgy Research Lab., University, Ala.

Descriptors: \*Bricks, \*Glass, Clays, Fluxes, Wastes, Manufacturing, Firing, Production engineering, Structural clay products, Sizing materials, Utilization, Waste disposal.  
Identifiers: \*Solid waste disposal.

The investigation was undertaken to demonstrate how waste glass might be used to lower the required firing temperature and firing time of structural clay products. Mixtures of waste glass and common clays were formed by stiff-mud extrusion and fired to the temperature required to produce a body having 6-7 percent absorption. Substitution of glass for one-half the clay in a red body reduced the firing temperature 500F, making a 30 percent increase in production possible; in a tan body the firing temperature was reduced 400F making a 25.3 percent increase in production possible. (Author)

**PB-214 489/7** PC A05/MF A01  
International Society for Rehabilitation of the Disabled, New York.



## **Closing the Communications Gap. The Role and Functions of Information Media in Rehabilitation Services**

Final rept. 1967-69  
Charles Kalisky. 1971, 99p SRS-RD-2297  
Grant SRS-RD-2297

Descriptors: \*Rehabilitation, \*Information systems, \*Periodicals, Effectiveness, Communications management, Handicapped workers, Project planning, Organizations, Improvement, International relations, Reviews, Manpower utilization, Services, Developing countries, Methodology, Bibliographies.  
Identifiers: Disabled persons.

The final report of the International Rehabilitation Program Development Project determines ways and means of improving information services for those working with the handicapped all over the world. Specifically, the project has demonstrated the value of a periodical published in the major languages to disseminate news and significant developments in the field. A number of novel services were initiated, including a series of papers and reports on advanced techniques and methods designed to assist workers in developing countries; a bibliography of available material on rehabilitation in several languages; an international library of films and slides to aid in training personnel; a multilingual glossary of rehabilitation terms; and a Research Referral Service to act as a clearinghouse for current information. (Author)

**PB-214 508/4** **PC A03/MF A01**

Illinois State Water Survey, Urbana.  
**Nonpoint Rural Sources of Water Pollution**  
Shundar Lin. 1972, 40p\* Rept no. ISWS-73-CIR1111

Prepared in cooperation with Illinois State Dept. of Registration and Education.

Descriptors: \*Surface water runoff, Water pollution, \*Water pollution, \*Rural areas, \*Nutrients, Water pollution, \*Agricultural wastes, Water pollution, Reviews, Fertilizers, Nitrogen, Phosphorus, Illinois, Soil erosion, Sources, Livestock, Industrial waste treatment, Pesticides, Subsurface drainage. Identifiers: Feedlot wastes, Manure, Water pollution control.

A literature survey was made to gather information for defining the quantity and characteristics of nonpoint water pollution sources from rural areas. Major constituents of such pollution include fertilizers, pesticides, erosion and sediment, and animal wastes. Studies showed that nitrogen and phosphorus from surface runoff and subsurface drainage are often greater in concentration than that from sewage effluents. Pesticides are only slightly soluble in water, and about 5 percent of that applied may enter waterways through surface runoff and erosion. With the exception of sediment transport, farm animal wastes can be the most serious sources of pollution from farm lands. Control techniques are discussed.

**PB-214 534/0** **PC A03/MF A01**

Joint Study Group on Agricultural Engineering in Brazil.

**Study for Agricultural Engineering Development in Brazil**

Rept. for 24 Jul-12 Aug 72.  
12 Aug 72, 43p TA/OST-NAS-72-39  
Contract AID/csd-1122  
Report of the Joint Study Group on Agricultural Engineering in Brazil US-Brazil Science Cooperation Program.

Descriptors: \*Agricultural engineering, \*Education, \*Brazil, Agricultural engineering, Research, Policies, Recommendations, Food industry, Professional personnel, Awareness, Developing countries.

The joint study group was established to identify the most urgent research and training needs in agricultural engineering in Brazil, and to recommend how best to meet those needs. Specific recommendations are given for a long-term program to establish quality programs in education and research in agricultural engineering in Brazil and means to gain recognition for agricultural engi-

neering as a profession under Brazilian law. (Author)

**PB-214 862/5** **PC A03/MF A01**

Agency for International Development, Washington, D.C. Office of Science and Technology.

**RANN (Research Applied to National Needs) Program: Potential Benefits to Developing Countries**

Jan 73, 48p Rept no. TA/OST-73-16

Descriptors: \*Developing countries, \*Transfer of technology, Impact, Project planning, Benefit cost analysis, Resources, Information systems, Disasters, Energy, Urban planning, Environmental engineering, Water pollution, Sociometrics, Community development, Services.

Identifiers: \*Spinoffs, Technological development, RANN program.

RANN stands for Research Applied to National Needs -- an expanding program of the National Science Foundation designed to stimulate the harnessing of science in the service of man. This report identified 48 individual RANN projects that could have special relevance to the needs of developing countries. It clarifies their technical significance to these countries and illustrates possible types of spin-off benefits. No attempt is made to identify how a specific research project might benefit a particular developing country. Rather, the attempt here is to indicate in a general way the nature of the potential benefit to developing economies within the context of technology transfer.

**PB-214 870** **PC A09/MF A01**

California Inst. of Tech., Pasadena.

**100 Problems in Environmental Health.**

W. L. Faith, Jack E. McKee, H. Heukelekian, Thomas F. Mancuso, and Emil M. Mrak. 1961, 198p  
Grant PHS-RG-7263

Descriptors: \*Public health, \*Pollution, Air pollution, Water pollution, Industrial medicine, Food industry, Water supply, Waste disposal.  
Identifiers: Solid waste disposal, EPAL.

Contents:

- Air pollution;
- Food science and technology;
- Occupational health;
- Water supply and water pollution;
- Solid waste disposal and miscellaneous.

**PB-214 984** **PC A03/MF A01**

Public Health Service, Washington, D.C.

**Refuse Collection and Disposal for the Small Community.**

William A. Xanten, and Ralph J. Van Derwerker. Nov 53, 46p  
Prepared in cooperation with the American Public Works Association, Chicago, Ill.

Descriptors: \*Communities, Waste disposal, \*Waste disposal, Planning.  
Identifiers: \*Solid waste disposal, EPAL.

Surveys have shown that many small communities do not follow sanitary refuse practices. There are many reasons why these communities have not taken steps to protect the health and welfare of their citizens. Predominant among the basic causes, however, is the belief that adequate service is too expensive, and a lack of information on how to establish and operate a satisfactory system. It has been clearly demonstrated many times, that urban fly control and rodent control must be based upon adequate storage, collection, and disposal of community wastes. A practical refuse control program is within the means of any community. This publication proposes to describe certain factors which needs to be considered in establishing sanitary refuse practices, and to present representative operational and cost data in such manner that they may be interpreted to meet local conditions.

**PB-215 103** **PC A02/MF A01**

Field Information Agency, Technical.

## **Materials, Techniques, and Testing Methods for the Sanitation (Bacterial Decontamination) of Small-Scale Water Supplies in the Field Used in Germany During and after the War.**

Final rept.  
Alexander Goetz. 8 Dec 47, 10p Rept no. FIAT-1313

Descriptors: \*Sewage treatment, \*Military operations.  
Identifiers: EPAL.

The report presents results obtained from investigations of the nature and methods for water purification used in Germany during and following the second world war.

**PB-215 149/6** **PC A04/MF A01**

Agency for International Development, Washington, D.C.

**Techniques for Assessing Hydrological Potentials in Developing Countries (State of the Art and Research Priorities)**

Jan 73, 74p TA/OST-73-17

See also PB-207 192.

Descriptors: \*Water resources, Developing countries, \*Hydrology, Research, Stream flow, Soil erosion, Ground water, Sediment transport, Remote sensing, Probes, Soil water.

The report describes current capabilities and future needs for assessing hydrological potentials under the following topical headings: stream flow, erosion and sediment transport, water movement in unsaturated soils, ground water, precipitation, evaporation, and hydrologic applications of remote sensing. Established techniques and methodologies are described under 'State of the Art', while the most interesting emerging areas for attention by developing countries and foreign assistance agencies are presented under sub-topics entitled 'Current Research' and 'Research Opportunities for Application in Developing Countries.' The report is based in part on a preliminary analysis prepared by the U.S. Geological Survey, 'Techniques for Assessing Water Resource Potentials in the Developing Countries,' Open File Report, December 1971. (Author)

**PB-215 282/5** **PC A02/MF A01**

Environmental Protection Agency, Cincinnati, Ohio. Solid Waste Management Office.

**Residential Solid Waste Generated in Low-Income Areas**

Samuel Hale, Jr. 1972, 17p Rept no. EPA-SW-83TS

Descriptors: \*Waste disposal, \*Socioeconomic status, \*Urban areas, Waste disposal, Distribution(Property), Characteristics, Trends, Residential buildings.  
Identifiers: \*Economically depressed areas, Disadvantaged groups, Low income groups, \*Poverty areas, \*Solid waste disposal.

Variations inherent in the generation of solid wastes make it extremely difficult to predict quantities that can be expected from a dwelling within a residential neighborhood. Some possibly influencing factors are climate, season, socioeconomic level, and dweller density. The objective of the study was to examine the quantities and critical factors involved in the generation of solid wastes in low-income residential neighborhoods. The results are presented in order that a better understanding of waste quantities and characteristics may be obtained. (Author)

**PB-216 240** **PC A06/MF A01**

National Center for Urban and Industrial Health, Cincinnati, Ohio.

**Manual of Septic-Tank Practice.**

1967, 101p Rept no. PHS-Pub-526  
Prepared in cooperation with the Joint Committee on Rural Sanitation. Revision of report dated 1957 and reprinted 1963.

Descriptors: \*Septic tanks, Reviews, Design, Handbooks.  
Identifiers: EPAL.

Contents:



Septic tank - soil absorption systems for private residences;  
Septic tank - soil absorption systems for institutions, recreational areas, and other establishments.

**PB-216 556** **PC A03/MF A01**  
New Mexico State Univ., University Park. Engineering Experiment Station.  
**Controlling Factors in Methane Fermentation.** Summary of research progress rept. 1 Sep 62 - 1 Sep 64  
R. E. Speece, and R. S. Engelbrecht. 1964, 46p  
Grant FWPCA-WP-00394

Descriptors: \*Anaerobic processes, Process variables, \*Sewage treatment, Anaerobic processes, \*Fermentation, \*Metabolism, Nutrients, Digestion(Decomposition).  
Identifiers: \*Methane bacteria, EPAL.

A number of approaches have been taken in attempting to evaluate the important factors which control the rate of methane fermentation in anaerobic digestion. The ultimate goal of the research has been to determine the chemical, physical, and biochemical requirements which will enable the methane fermentation to proceed at rates on the order of one magnitude greater than commonly observed in conventional anaerobic digestion. A considerably detailed study was conducted to assay the methane fermentation stimulation potential of six compounds which had shown promise in a previous study conducted by the principal investigator. Next, a series of studies was designed to evaluate the influence of many physical and chemical factors involved in digestion. Following this, the methane fermentation requirements for trace organics, such as vitamins and amino acids was studied. Combinations of individual amino acids and vitamins as well as mixtures, e.g. case in hydrolyzate (enzymatic), yeast extract, and fortified vitamin B complex, were assayed for their stimulation potential. The surface charge on the microorganisms was altered by inorganic and organic coagulating agents while observing the acetate utilization rate.

**PB-217 117/1** **PC A06/MF A01**  
National Academy of Science, Washington, D.C.  
**Regional Workshop on Water Resources, Environment, and National Development. Volume I. Summary of Proceedings. Singapore, March 13-17, 1972**  
Mar 72, 120p  
Contract AID/csd-2584  
Prepared in cooperation with the Science Council of Singapore.

Descriptors: \*Water pollution, Southeast Asia, \*Developing countries, Water resources, \*South-east Asia, Water resources, Meetings, Water quality, Sewage treatment, Industrial wastes, Water supply, Population growth, Singapore, Pesticides, Regional planning.  
Identifiers: Oil pollution, Eutrophication, Solid waste disposal, \*Water pollution abatement, AID.

The report contains the summary of proceedings of a workshop organized under the joint sponsorship of the Science Council of Singapore and the National Academy of Sciences of the U.S.A. Its main purpose was to focus attention on current problems of water resources and the environment faced by countries of the Southeast Asian region, and stimulate regional cooperation in seeking solutions.

**PB-217 118/9** **PC A03/MF A01**  
National Academy of Sciences, Washington, D.C.  
**Workshop on Industrial and Technological Research, Jakarta, Indonesia. Volume 1**  
Jan 71, 38p  
Contract AID/csd-2584  
Prepared in cooperation with Indonesian Institute of Science (Lembaga Ilmu Pengetahuan Indonesia), Kjakarta. See also PB-218 724.

Descriptors: \*Economic development, \*Indonesia, Developing countries, Industries, Education, Meetings, Problem solving, Shortages, Policies, Planning, Financing, Reviews.  
Identifiers: Workshops, Technological development, AID.

Overall findings and recommendations of the Workshop are presented. The concern of the Workshop was the strategy for using research, development, and engineering to assist in achieving the desired industrial growth in Indonesia. Problem areas discussed include shortages in trained manpower, laboratory facilities, equipment and supporting services, national science policy, funding level, and need for science planning and coordination at the national level.

**PB-217 119/7** **PC A12/MF A01**  
National Academy of Sciences, Washington, D.C.  
**Conservacion del Medio Ambiente Fisico y el Desarrollo (Environment and Development)**  
Jul 71, 254p  
Contract AID/csd-2584  
Text in Spanish. Summary in English. Primer Seminario Centroamericano Sobre el Medio Ambiente Fisico y el Desarrollo, Antigua, Guatemala, 25-30 Jul 71. See also report dated Jul 71, PB-211 487.

Descriptors: \*Economic development, \*Central America, \*Environment, \*Developing countries, Meetings, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Agriculture, Industries, Forestry, Services, Regional planning, Education, Pesticides, Water resources.  
Identifiers: AID.

In developing regions like Central America there are appearing signs, sometimes alarming, of environmental contamination and degradation of natural resources. The first Central American Workshop on Development and the Environment examines in depth the regional environmental problems, and provides the planning directors and governmental officials with the necessary criteria for incorporating environmental aspects into their development programmes. The focus of the Workshop was on the industrial, agricultural, and service industry sectors. Included in the report are background papers and the recommendations of the Workshop.

**PB-217 142** **PC A04/MF A01**  
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.  
**Engineering Studies of Coffee Mill Wastes in El Salvador, C. A., October 18-November 9, 1960.** Hayse H.. Black. Apr 61, 57p  
Report to International Cooperation Administration, United States of America Operations Mission to El Salvador.

Descriptors: \*El Salvador, \*Water pollution, \*Food processing, \*Industrial waste treatment.  
Identifiers: \*Coffee processing, \*Water pollution control, EPAL.

The report pertains to control and treatment of both solid and liquid wastes from processing coffee in El Salvador. Included are: Notes on conferences and observations pertaining to wastes from processing coffee in El Salvador during the period October 18 to November 9, 1960; Review of technical literature dealing with control and treatment of liquid wastes resulting from the processing of coffee; and Future research on coffee wastes.

**PB-217 276** **PC A02/MF A01**  
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.  
**Septic Tank Design Economic Factors Involved.** James B. Coulter. 1955, 20p  
Presented at the Home Sewage Disposal Training Conference at Michigan State College, East Lansing, Mich., 11 Jan 55.

Descriptors: \*Septic tanks, Design.  
Identifiers: EPAL.

In light of present knowledge, the idea should be discarded that there is a single best design for a septic tank. Acceptable performance can be obtained with a wide range of freedom in design. The report reviews the current design status.

**PB-217 293/0** **PC A05/MF A01**  
National Academy of Sciences, Washington, D.C.

**A Report on the LIPI-NAS Workshop on Natural Resources. Volume I. Overall Findings and Recommendations-Working Group Reports**  
1972, 81p  
Contract AID/csd-2584  
Prepared for Workshop on Natural Resources, held in Jakarta (Indonesia) 11-16 Sep 72. Prepared in cooperation with Indonesian Institute of Science (Lembaga Ilmu Pengetahuan Indonesia), Djakarta.

Descriptors: \*Economic development, Natural resources, \*Natural resources, \*Indonesia, Developing countries, Land, Soils, Forestry, Water resources, Oceans, Mineral deposits, Policies, Recommendations, Meetings.  
Identifiers: AID.

The purpose of the Workshop was to formulate recommendations on how to utilize the natural resources of Indonesia in a manner consistent with the needs and rising expectations of a growing population. Specific objectives were: (1) to suggest policies and procedures for strengthening the integrated planning and utilization of natural resources; (2) to suggest scientific and technological inputs; and (3) to provide a form for a coordinated and constructive exchange of views by key scientists, policy-makers, and administrators. Part I of the Report considers problems and major recommendations. Sectoral recommendations are given in Part II. (Author)

**PB-217 667** **PC A09/MF A01**  
Harvard Univ., Cambridge, Mass. Div. of Engineering and Applied Physics.  
**Operations Research in Water Quality Management.** Final rept.  
Harold A. Thomas, Jr, and Robert P. Burden. 15 Feb 63, 179p  
Contract PH-86-62-140

Descriptors: \*River basin development, \*Mathematical models, \*Water resources, \*Operations research, Stream flow, Sewage treatment, Economic development.  
Identifiers: EPAL.

New methods are reported for evaluating the composite effects of combinations of streamflow regulation, waste water treatment, and waste water regulation for application in comprehensive programs to improve and maintain the quality for water in major water resources systems. The objective is to show how these methods may be used to strengthen the rational base for river basin planning by use of mathematical systems analysis.

**PB-217 790** **PC A02/MF A01**  
Robert A. Taft Sanitary Engineering Center. Cincinnati, Ohio.  
**Treatment of Wastes from Coffee Processing in Costa Rica.** Herbert R. Pahren, and Rudolfo F. Saenz. 1960, 19p Rept no. SEC-TR-W60-2

Descriptors: \*Food processing, \*Industrial waste treatment, Costa Rica.  
Identifiers: \*Water pollution control, \*Coffee processing, EPAL.

To determine the feasibility of the treatment of these wastes in stabilization ponds in the country of Costa Rica, a preliminary study was made to learn more about the characteristics of the coffee wastes. Tentative calculations were then made concerning the size of stabilization ponds necessary for these wastes. A brief outline of the information collected is summarized.

**PB-218 226** **PC A05/MF A01**  
Public Health Service, Washington, D. C. Div. of Sanitary Engineering Services.  
**Manual of Septic-Tank Practice. Developed in Cooperation with the Joint Committee on Rural Sanitation.** 1 Aug 59, 96p Rept no. PHS-Pub-526  
Addendum to part I inserted.

Descriptors: \*Septic tanks, \*Manuals.  
Identifiers: EPAL.

The Manual on septic tank practices has been prepared for use as a guide by health agencies, build-



ing officials, installers, and others, to meet the need for an authoritative treatise on the subject.

**PB-218 232/7** PC A06/MF A01  
Foreign Economic Development Service, Washington, D.C.  
**Planning Korea's Agricultural Development. Analyses and Recommendations for the Third Five Year Plan**

William R. Gasser, James P. Cavin, Richard S. Magleby, Edward S. Micka, and Troy Mullins.  
Aug 70, 110p FEDS-Field-5, TA/OST-AN-70-8-2

Descriptors: \*Agricultural economics, \*South Korea, Economic development, Livestock, Grains(Food), Marketing, Income, Planning, Demand(Economics), South Korea.  
Identifiers: AID.

The population of the Republic of Korea is expected to exceed 35 million by 1976, a gain of about 13% over the 1969 figure. In the same period, the Gross National Product in real terms is projected to increase more than 80%, with income per capita showing a gain of about 78%. This population and income growth will generate a rapid rise in the demand for food, requiring an expansion of 25% to 30% in the total supply of farm products. This report contains a series of recommendations concerning steps that may be taken to effect this expansion in the areas of agricultural production and marketing. Consideration is given to the general improvement of long-range projections, livestock improvement plans, problems relating to grains, evaluation of marketing needs, and proposed reorganization for economic research. (Author)

**PB-218 338/2** PC A03/MF A01  
Transport and Road Research Lab., Crowthorne (England).

**A Deflection Survey Technique for Pavement Evaluation in Developing Countries**  
H. R. Smith. 1973, 40p Rept no. TRRL-LR-525

Descriptors: \*Flexible pavements, Deflection, \*Highways, Developing countries, Tropical regions, Design, Surveys, Evaluation, Covering, Test methods, Malaysia, Zambia, Great Britain.  
Identifiers: GBRRRL.

The role of deflection beam surveys in the evaluation of flexible pavements is discussed. Deflection studies in Malaysia and Zambia are described from which a suitable survey method for use on tropical roads, for the purpose of designing strengthening overlays or pavement reconstruction, has been developed. Testing at 100m intervals in both wheel-tracks is recommended with provision for a higher density of testing if the road deflection is variable, or if the road surface has areas of visible distress, or if there are occasional very high deflection values. Deflection values of roads tend to exhibit skewed distributions but it is concluded that this is not necessarily a significant factor from the point of view of survey analysis for practical overlay design. (Author)

**PB-218 681/5** PC A04/MF A01  
Texas A and M Univ., College Station. Water Resources Inst.

**An Investigation of Hydrological Aspects of Water Harvesting**  
Research project completion rept. 1 Jul 69-31 Aug 72  
Otto Wilke, Jack Runkles, and Charles Wendt.  
Sep 72, 65p TR-46, OWRR-B-071-TEX(2)  
Contract DI-14-31-0001-3132

Descriptors: \*Catch basins, Surface water runoff, \*Water supply, Arid land, Playas, Lakes, Erosion control, Crude oil, Precipitation(Meteorology), Slopes, Cost estimates, Economic analysis, Simulation, Mathematical models, Texas.  
Identifiers: Lubbock(Texas), Amarillo(Texas), Texas High Plains, OWRR.

Water harvesting is a potential source of water for arid and semi-arid lands. The objectives were to determine combinations of land surface treatments and land forming which result in efficient but inexpensive water harvesting catchments and to determine the optimum shape of catchments. In laboratory studies with inexpensive materials,

crude oils exhibited the best sealing properties. However, by six months after application, 750 gal per ac of crude oil has no apparent effect on runoff from field plots. Water harvesting catchments constructed by grading the soil to form V-shaped valleys and then compacting the surface yielded runoff equal to 31 to 43 percent of all precipitation. After rains, sand blown from such catchments may damage tender downwind vegetation. Some water erosion occurred, but, after two years, the basic shape and the performance of the catchments had not been damaged by erosion. Chemical weed control is recommended. (Author Modified Abstract)

**PB-218 990/0** PC A04/MF A01  
Denver Regional Council of Governments, Colo.

**Recycling Activity Description: Transfer, Intermediate Storage, Processing, Recycling**  
Final rept.  
May 72, 56p\* Rept no. DRCOG-72-013  
Contract HUD-H-1392  
Prepared in cooperation with Urban Drainage and Flood Control District, Denver, Colo.

Descriptors: \*Waste disposal, Colorado, \*Regional planning, Waste disposal, Materials recovery, Storage, Trends, Forecasting, Management planning.  
Identifiers: Waste transfer stations, Waste recycling, \*Solid waste disposal, \*Denver(Colorado), Reuse project, UPDCD.

The report includes a description of the four functions relating most directly to solid waste recycling, reuse, or resource recovery, including transfer, intermediate storage, processing, and recycling. The Denver, Colorado area was used for the study. The present situation is also summarized, and long-range trends for each function are forecast. Recent and current citizens group and industry activity in recycling programs is described. As a basis for improving the existing situation as described, a number of technical and management concepts are presented in relation to their current and future feasibility, possible date of availability, or the form of management action required to implement them. (Author Modified Abstract)

**PB-219 683** PC A10/MF A01  
North Carolina State Univ., Raleigh. Dept. of Economics.

**A Generalized Crop-Fertilizer Production Function. (631.88-R988).**  
Doctoral thesis  
James Garrett Ryan. 1972, 211p AID-631.88-R988  
Contract AID/csd-2806

Descriptors: \*Farm crops, \*Soil fertility, \*Fertilizers, Agricultural economics, \*Agricultural economics, \*Peru, Potatoes, Production capacity, Recommendations, Nitrogen, Phosphorus, Potassium, Theses.  
Identifiers: Production functions, AIDH.

The problem examined in this study is the derivation of a generalized crop-fertilizer production function describing the response relation between measured soil characteristics, applied nutrients, weather and crop yield. It is hypothesized the function can be used to generate specific fertilizer recommendations to farmers based on soil analysis. The data come from potato-fertilizer experiments conducted on 65 farm locations over a seven year period in the Sierra Region of Peru. A quadratic model was chosen as the most appropriate form to describe the response relationships in these data. (Author Modified Abstract)

**PB-219 684** PC A02/MF A01  
Ohio State Univ., Columbus. Dept. of Agricultural Economics and Rural Sociology.

**Is Inexpensive Credit a Bargain for Small Farmers: The Recent Brazil Experience. (Br-332.71-A211a).**  
Occasional paper  
Dale W. Adams, Harlan Davis, and Lee Bettis.  
Jan 72, 16p Occasional Paper-58, AID-BR-332.71-A211a  
Contract AID/csd-2501  
Report on 'Studies in Agricultural Capital and Technology.'

Descriptors: \*Agricultural economics, \*Developing countries, \*Credit, \*Economic analysis, Brazil, Banking business, Policies, Problem solving, Recommendations.  
Identifiers: \*Small farmers, AIDH.

The authors discuss major credit distribution problems on the supply side of credit in Brazil as they affect the problem of extending credit to small farmers. They suggest that adjustments in current policies might substantially increase the flow of credit to small farmers through regular banking channels. Information from Brazil is used to illustrate the contention. The following topics are considered: background on agricultural credit in Brazil; interest rate policy; institutional agricultural credit; results from credit and interest rate policies; reasons for loan concentrations; conclusions; and policy recommendations. (Author Modified Abstract)

**PB-219 685** PC A03/MF A01  
Ohio State Univ., Columbus. Dept. of Agricultural Economics and Rural Sociology.

**An Analysis of Shifting Relative Prices and Marketing Facility Investments in the Context of Technological Change in the Developing Countries. (338.13-J65).**  
Occasional paper  
S. S. Johl. Oct 71, 27p Occasional Paper-37, AID-338.13-J65  
Contract AID/csd-2501  
Report on 'Studies in Agricultural Capital and Technology'.

Descriptors: \*Agriculture, \*Developing countries, \*Marketing, \*Economic analysis, India, Prices, Production rate, Growth, Grains(Food), Regulations, Incentives, International trade.  
Identifiers: Imports, AIDH.

The author states that agricultural production growth of most of the developing countries in the last 3-4 years has very considerably decreased their dependence on imports, especially food grains. This shift from heavy dependence on imports to fast-increasing internal surpluses has created the need for new government regulations governing the control and operation of markets so that the domestic market becomes fully responsive to the production changes and at the same time keeps up the incentives for higher and better production. (Author)

**PB-219 688** PC A02/MF A01  
Cornell Univ., Ithaca, N.Y. Dept. of Agricultural Economics.

**Some Aspects of the Suitability of High Yielding Rice and Bajra Varieties for the Small Farm, Thanjavur and Mehsana Districts, India. (In-633.18-S346).**  
Rept. for Dec 70-Oct 72  
Michael G. G. Schuller, and Richard W. Longhurst. Oct 72, 23p Occasional Paper-57, AID-IN-633.18-S346  
Contract AID/csd-2805

Descriptors: \*Rice plants, Farms, \*Farm management, \*India, Yield, Prices, Plant genetics, Cost comparison, Manpower.  
Identifiers: \*Small farms, \*Thanjavur District(India), \*Mehsana District(India), \*Rice ADT-27, Agricultural development, AIDH.

In order to evaluate farmers' response to the new rice and bajra varieties, the Indian Institute of Management at Ahmedabad undertook an intensive study of two districts--Mehsana District in Gujarat for a study of hybrid bajra, and Thanjavur District in Tamil Nadu, for a study of ADT-27, a new high yielding rice variety. In each district, use of inputs, yields and prices were collected from approximately 60 farmers who had adopted the new varieties of seed on some part of their acreage, and approximately 40 who had grown only the traditional varieties. A regression framework is used to examine factors affecting the extent of adoption of ADT-27 in Thanjavur. This is supplemented by comparative production function analysis of ADT-27 and traditional rice varieties. Hybrid and local bajra are compared, again with production function analysis. Finally, an assessment is made of ADT-27 and hybrid bajra as to their suitability for the small farmer. (Author Modified Abstract)



**PB-219 690** PC A03/MF A01  
Cornell Univ., Ithaca, N.Y. Dept. of Agronomy.  
**Organic Phosphorus in Soils with Special Interest in Soils of the Tropics. 631.4-R645.**  
Rept. for Jun 69-Jan 73  
K. J. Roberts, and R. M. Weaver. Jan 73, 34p  
Agronomy Mimeo-73-1, AID-631.4-R645  
Contract AID/csd-2490

Descriptors: \*Soil chemistry, Phosphorus organic compounds, \*Soil fertility, \*Tropical regions, Cultivation, Plant growth, Nucleic acids, Lipids, Nitrogen organic compounds, Clay minerals, Weathering, Cation exchanging, Leaching, Extraction, Ignition.  
Identifiers: AIDH.

It is the purpose of this study to review and summarize the existing knowledge and literature on organic phosphorus in highly weathered soils of the tropics. This review includes many references which are concerned primarily with organic phosphorus as present in soils of temperate regions. This is included to serve as a starting point for investigations in tropical areas. The three major topics covered are: identification and determination of specific forms of organic phosphorus; mineralization of organic phosphorus; and determination of total organic phosphorus. Less attention is given to microbiological aspects of the problem. Specifically, the author discusses and reviews the following topics: inositol phosphates; phospholipids; nucleic acids; correlation with organic nitrogen and carbon; effects of cultivation and presence of plants; effects of soil organic phosphorus-clay mineral interactions; extraction methods; ignition methods and comparative studies of extraction versus ignition methods. (Author)

**PB-219 695** PC A03/MF A01  
Cornell Univ., Ithaca, N.Y. Dept. of Agronomy.  
**Nitrogen Fertilization in the Humid Tropics. (631.8-F793).**  
Rept. for Jun 69-Nov 72  
Richard H. Fox. Nov 72, 27p Agronomy Mimeo-72-17, AID-631.8-F793  
Contract AID/csd-2490  
Presented at the Tropical Soil Research Seminar, Ibadan, Nigeria, May 1972.

Descriptors: \*Fertilizers, Nitrogen inorganic compounds, \*Soil fertility, Tropical regions, Field tests, Corn plants, Grain crops, Puerto Rico.  
Identifiers: AIDH.

In the humid tropics, as in temperate areas, sustained high production of nonleguminous crops can be accomplished only by the addition of N to the soil. Two years ago, field experiments were started in Puerto Rico to determine the most efficient means of supplying N fertilizer to non-leguminous crops. The author discusses the following topics in this research study: the need for and use of N fertilizers; sources of fertilizer N; placement and time of application of fertilizer N; fertilizer N recovery; N-losses; NO<sub>3</sub> retention; soil test methods; fertility maintenance; nitrogen fertilization experiments in Puerto Rico; and conclusions. The most salient findings of the N fertilization experiments with corn and sorghum are given. (Author Modified Abstract)

**PB-219 696** PC A02/MF A01  
Ohio State Univ., Columbus. Dept. of Agricultural Economics and Rural Sociology.  
**Changes in Small Farmer Credit Use in Southern Brazil, 1965-69. (Br-332.71-A211).**  
Occasional paper, Jun 69-Feb 72  
Dale W. Adams, and Joseph L. Tommy. 11 Feb 72, 10p Occasional Paper-61, AID-BR-332.71-A211  
Contract AID/csd-2501

Descriptors: \*Agricultural economics, \*Brazil, \*Credit, Surveys, Banking business, Policies, Statistical data, Economic analysis, Classifications.  
Identifiers: \*Small farmers, \*Nonbank credit, AIDH.

The paper summarizes the results of a study in southern Brazil which was focused at determining the characteristics of farmers who received additional bank credit during the period 1965 to 1969. Information is also presented on changes in use of non-bank credit among farmers over the same

period. Data were drawn from two sample surveys covering farm operation in 1965 and 1969 for 289 farms in southern Brazil. All of the units had 124 acres or less. Principle economic activities on the farms included various mixed enterprises of corn, beans, rice, wheat, hogs and dairy. Inducing banks to loan in a more socially efficient manner appears to be a major challenge. (Author Modified Abstract)

**PB-219 702** PC A02/MF A01  
International Rice Research Inst., Los Banos, Laguna (Philippines). Agricultural Engineering Dept.  
**Development of Agricultural Mechanization Technologies at the International Rice Research Institute. (Fea-631.3-K45).**  
Rept. for Jul 65-Jan 73  
Amir U. Khan, and Bar Duff. Jan 73, 25p Paper-72-02, AID-Fea-631.3-K45  
Contract AID/csd-2541  
Presented at Woodrow Wilson School, Princeton Univ., 20-23 Sep 72, and At Council for Asian Manpower Studies at Penang, Malaysia, 3-5 Jan 73.

Descriptors: \*Agricultural machinery, Design, \*Rice plants, Agricultural machinery, Cultivation, Efficiency, Production capacity, Southeast Asia, Philippines.  
Identifiers: AIDH.

The Institute recognizes the urgent need for suitable farm machines for tropical agriculture and the catalytic role that machinery design and development activities can play in the establishment of an indigenous farm equipment manufacturing industry in the South and South-East Asian region. The IRRI program of machinery development is therefore sharply focused towards providing designs of agricultural machines for the production and processing of rice with two major objectives in mind. One, the machines must meet the requirements of the 2-to 10-hectare farmers who can neither afford to use imported mechanization technology nor work efficiently with traditional methods. Two, the machinery designs must use to a maximum extent, locally available manufacturing methods, materials, labor and other resources of the region. (Author Modified Abstract)

**PB-219 703** PC A02/MF A01  
Johns Hopkins Univ., Baltimore, Md. Dept. of Pediatrics.  
**Report on Wheat-or Oat-Soy Mixtures. (612-398-G739b).**  
Progress rept. Jul 66-Dec 71  
George G. Graham. Dec 71, 16p AID-612-398-G739b  
Contract AID/csd-1433, AID/csd-2946

Descriptors: \*Wheat, Proteins, \*Cereals, Nutrition, Flours(Food), Soybeans, Oats, Diets, Nutrition, Lysine.  
Identifiers: AIDH.

Much of the effort directed at improving the diets of needy people is centered on the improvement of the protein content and quality of cereals by the addition of protein-rich foods, protein concentrates, or essential amino acids. The combination of wheat and soy flours makes much sense as the second should correct the lysine deficiency of the first. Such a mixture is now being made available by our government in its international programs as WSB, or wheat-soy-blend. The study reports its evaluation in the diet of convalescent malnourished and normal infants and children. Included are results obtained with another wheat-soy blend and with an oat-soy blend. (Author Modified Abstract)

**PB-219 708** PC A03/MF A01  
Kansas State Univ., Manhattan. Food and Feed Grain Inst.  
**Tour of Some U. S. Grain Storage Facilities for Entente Fund Officials. (Afr-631.23-C559).**  
Trip rept. no. 30, 11 May-16 May 72  
Do Sup Chung. May 72, 27p AID-AFR-631.23-C559  
Contract AID/csd-1588  
Report on Food Grain Drying Storage. Handling and Transportation.

Descriptors: \*Grains(Food), \*Storage, \*Buildings, Evaluation, Surveys, Facilities, Kansas, Developing countries, West Africa, Problem solving, Silos.  
Identifiers: AIDH.

A four day tour of grain storage facilities for Entente Fund officials was conducted by Kansas State University. Fundamental principles concerning condensation and problems related to condensation in metal storage buildings were discussed. The following aspects were considered to be important in reducing the possibility of condensation in metal storage facilities for bagged grains: (1) adequate ventilation (2) white paint used to paint the exterior, (3) do not stack grain bags against the walls, and (4) cover the grain pile with a plastic sheet, or put insulation on the roof inside of the storage building, thus creating at least a twenty-degree F. temperature differential between the interior and exterior air. (Author Modified Abstract)

**PB-219 710** PC A02/MF A01  
Cornell Univ., Ithaca, N.Y. Dept. of Agricultural Economics.  
**Preliminary Observations on the Production of New High Yielding Rice Varieties and Traditional Rice Varieties in Suphan Buri, Thailand. (Th-633.18-B974).**  
Rept. for Dec 70-Feb 72  
William R. Burton, and Tongruay Chungtes. Feb 72, 16p Occasional Paper-52, AID-TH-633.18-B974  
Contract AID/csd-2805  
Presented at Kasetsart University, Bangkok, Thailand. Feb 1-4, 1972.

Descriptors: \*Rice plants, Farms, \*Farm management, Thailand, Production capacity, Selection, Cost factors, Rural areas.  
Identifiers: AIDH.

The research paper discusses field research in Thailand on certain economic aspects of new rice technology, particularly the new high yielding rice varieties and associated inputs. The actual location of the study area was in Suphan Buri Province, some 100 kilometers northwest of Bangkok, Thailand. A total of 153 rural households in six villages cooperated in the study. Forty of the rice farms were located in a deep water, broadcasted area where floating rice varieties are grown. The remaining 93 rice-farms were in a transplanted rice area where many farmers were growing the new high yielding rice varieties. The authors provide summary tables on the following topics: table of farms; planted area and varieties grown; farmers growing new varieties; area and variety planted for the 1970 and 1971 seasons. They include summary discussions of high yielding varieties other new rice technology, research and costs of production. (Author Modified Abstract)

**PB-219 711** PC A02/MF A01  
Utah State Univ., Logan. Dept. of Agricultural and Irrigation Engineering.  
**Economic Aspects of Irrigation from Ground Water. (Br-631.7-H279a).**  
George H. Hargreaves. 1972, 23p AID-BR-631.7-H279a  
Contract AID/csd-2167  
Presented at National Ground Water Symposium, Sao Carlos, Sao Paulo, Brazil, 27 Nov-1 Dec 72.

Descriptors: \*Irrigation, \*Agricultural economics, \*Ground water, Irrigation, \*Brazil, Irrigation, Design, Cost estimates, Drainage, Arid land, Farm crops, Soybean plants, Wheat plants, Forage crops, Cotton plants.  
Identifiers: AIDH.

Typical examples of economic analysis of ground water development in Brazil are discussed, citing specific data for Bolivian conditions with conversion to Cruzeiro values, but without a detailed knowledge of commodity prices and costs in Brazil. Use of ground water can produce both irrigation and drainage benefits -- pumping from underground reservoirs has alleviated many drainage problems. Typical irrigation systems were selected, designs developed, and costs estimated. From theoretical considerations, and from available crop, moisture - yield relationships developed in other areas, the supply of adequate moisture properly distributed throughout the growing season



should at least double production for cotton, sugar cane, soy beans, wheat, forage crops, and others with similar water requirements. Irrigation costs are analyzed. (Author Modified Abstract)

**PB-219 712** PC A15/MF A01  
Georgia Univ., Athens.  
**A Literature Review and Research Recommendations on Cassava 'Manihot Esculenta Crantz'.** (016.66423-H495).  
Research rept. Jul 69-Mar 72  
C. H. Hendershott. Mar 72, 341p AID-016.66423-H495  
Contract AID/csd-2497

Descriptors: \*Farm crops, Agronomy, \*Food, Developing countries, Food supply, Production, Ecology, Botany, Genetics, Soils, Cultivation, Plant diseases, Nutritive value, Biochemistry, Economics, Market research.  
Identifiers: \*Cassava, AIDH.

In the fall of 1969, a team of scientists from the University of Georgia was commissioned by the Technical Assistance Bureau of the Agency for International Development to (1) compile on a systematic basis the available information about cassava and related research now in progress; (2) synthesize, appraise, and analyze the information gathered and to determine as near as possible the broad limitations and potential of cassava as a food and feed crop; and (3) to prepare a list of research needs in their order of importance, for the orientation of future research on cassava. This team, consisting of ten men, represented the areas of Agronomy, Animal Nutrition, Botany, Economics, Food Science, Genetics, Horticulture, Human Nutrition and Plant Pathology. Each of their reports appear as a separate chapter in this manuscript and in each case represents their own view on cassava in their particular area of speciality. (Author)

**PB-219 713** PC A03/MF A01  
North Carolina State Univ., Raleigh. Dept. of Soil Science.  
**Agronomic Practices for Optimizing the Yield Potential of Short-Statured Rice Varieties in Latin America.** (Lat-633.18-S211).  
Research paper Jun 70-Nov 71  
Pedro A. Sanchez. Oct 71, 47p AID-LAT-633.18-S211  
Contract AID/csd-2806  
Presented at Seminar on Rice Policies for Latin American Centro Internacional de Agricultura Tropical, Cali, Colombia, 11 Oct 71.

Descriptors: \*Rice plants, Cultivation, \*Latin America, Rice plants, Seasonal variations, Climate, Soil fertility, Weed control, Irrigation, Plant growth, Production capacity, Fertilizers.  
Identifiers: AIDH.

The purpose of this paper is to illustrate the varietal response to specific cultural practices as examples of the kind of information needed for optimizing yields in each rice growing area in Latin American countries. Time of planting in relation to weather patterns is discussed for upland rice and irrigated rice. Planting systems, seed density and spacing are explained for upland rice systems, direct seeded-irrigated systems, and transplanted systems. Nitrogen response and response to other nutrients are described under rice fertilization. Weed control and harvest timing are included as important cultural practices. Examples of cultural practices interactions, total production costs and revenues and the effects of nitrogen levels are provided under economic considerations. The author concludes that the possibility of increasing rice yields throughout the different cropping systems in Latin America seem excellent if proper agronomic practices are adopted. (Author)

**PB-219 721** PC A02/MF A01  
Kansas State Univ., Manhattan. Food and Feed Grain Inst.  
**Development of a Simple Storage Unit and Storage Method Applicable for Humid Areas in Developing Countries.** (631.23-C559).  
Progress rept. no. 31  
Do Sup Chung. 30 Jun 72, 24p AID-631.23-C559  
Contract AID/csd-1588

Report on Food Grain Drying, Storage, Handling and Transportation.

Descriptors: \*Grains(Food), \*Storage, \*Environmental tests, \*Humidity, Developing countries, Environment simulation, Corn, Containers, Dessicants, Silica gel, Test chambers, Observation, Fungus deterioration, Time, Effectiveness, Adsorbents.  
Identifiers: \*Humid regions, AIDH.

The development of a simple, inexpensive grain storage unit and storage method which can be used at farm and local levels in humid areas in order to preserve the quality of grain is discussed. Losses result from inadequate facilities and improper handling of food grains. Efforts are devoted to the development of storage that would not require electricity, and that could be easily maintained and operated by unskilled labor. Materials, methods, time and partial results are discussed. The grain used in this preliminary report was corn. A silica-gel adsorbant appears feasible, but cheaper drying agents are needed. (Author modified abstract)

**PB-219 723** PC A04/MF A01  
International Rice Research Inst., Los Banos, Laguna (Philippines). Agricultural Engineering Dept.  
**Agricultural Equipment Development Research for Tropical Rice Cultivation.** (Rp-631.3-161b).  
Semiannual progress rept. 1 Jul-31 Dec 72, No 15  
Amir U. Khan, Fred E. Nichols, and Bart Duff.  
Dec 72, 59p AID-RP-631.3-161b  
Contract AID/csd-2541

Descriptors: \*Agricultural machinery, Design, \*Rice plants, Agricultural machinery, Cultivation, Production, Field tests, Test methods, Philippines.  
Identifiers: AIDH.

The major objectives of the contract continue to be the design, development, testing and extension of agricultural machinery for use by small-and medium-scale rice producers and processors in the tropics. Response from manufacturers now producing and those contemplating production of the 4-6 hp power tiller has been encouraging. Two manufacturers are now building a total of 200 power tillers a month in the Philippines. Evaluation of various machine concepts for the application of non-selective herbicides in rice and upland crops was initiated. The design of the axial-flow thresher neared completion. High output, multicrop use, simplicity in design, and ease of local manufacture should make it widely acceptable in most Asian countries. The second prototype of the PTO thresher is approaching completion. Following final testing and evaluation, it will be released to manufacturers for production. Simple lifting-finger mechanisms for harvesting lodged crops were installed on the stripper harvester. Field trials with the stripper harvester indicate that grain losses with the field machine have been reduced to 6 percent. Additional modifications should further reduce these losses. (Author)

**PB-219 725** PC A03/MF A01  
Ohio State Univ., Columbus. Dept. of Agricultural Economics and Rural Sociology.  
**Methodology and General Data Description: Farm Level Capital Formation in Sao Paulo, Brazil.** (Br-338.1-W515).  
Occasional paper, Jun 69-Dec 71  
Kelso L. Wessel, and William C. Nelson. Dec 71, 44p Occasional Paper-47, AID-BR-338.1-W515  
Contract AID/csd-2501

Descriptors: \*Agricultural economics, \*Capital, \*Farm management, \*Brazil, Surveys, Economic analysis, Production, Productivity, Statistical data, Prices, Classifications, Income, Consumption, Savings, Investments, Financing.  
Identifiers: San Paulo(Brazil), Government credit programs, Land tenure, Technical assistance, AIDH.

The focus of the research paper is on the capital formation process on Brazilian farms, with special emphasis on the role of credit and technology in bringing about rapid changes in agricultural production and/or productivity. An agricultural survey

was made of 383 farms in the state of Sao Paulo, Brazil, in 1970 in order to obtain the necessary farm level data. Several homogenous groups were identified which reflected farm characteristics of size, type, technology, tenure, market orientation, management level and mechanization. Analyses were made of farm organization, income, consumption, savings, investment and other distinguishing characteristics to show the production-income-growth process for each group. (Author Modified Abstract)

**PB-219 726** PC A06/MF A01  
Center for Disease Control, Atlanta, Ga.  
**Central America Malaria Research Station.** (Lat-614.4323-D419a).  
Final rept. Mar 67-Jul 72  
Geoffrey M. Jeffrey. 30 Jun 72, 120p AID-LAT-614.4323-D419a  
Grant PASA-RA(HM)-2-67  
Report on Malaria Program.

Descriptors: \*Malaria, \*Disease vectors, \*Culicidae, Malaria, Ecology, Insect control, Antimalarials, Insecticides, Public health, Epidemiology, Parasitic diseases, Central America.  
Identifiers: AIDH.

Central America was selected as the site for a research station because the malaria programs of the region had been facing numerous problems. Among the first work initiated by CAMRS were intensive studies on the ecology of the malaria vectors. The information from these continuing studies on activity patterns, breeding cycles and habitats, and vector associations with man has guided the selection and timing of antimosquito activities including dry-season larviciding of river habitats, water-management practices in coastal estuaries, exterior spraying of houses, ULV spraying, and release of sterile male mosquitoes. The results of a pyrimethamine-primaquine mass distribution field trial enabled CAMRS to recommend against an expensive change-over of drugs and, in addition, yielded information on the reasons for the low acceptance in mass drug distribution programs.

**PB-219 730** PC A03/MF A01  
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.  
**Micro-Level Farm Management and Production Economics Research among Traditional African Farmers: Lessons from Sierra Leone.** (SI-631.09664-S745).  
Dunstan S. C. Spencer. Sep 72, 35p AREP-3, AID-SL-631.09664-S745  
Grant AID/csd-3625  
See also report dated Jan 73, PB-219 757, and report dated Sep 72, PB-219 729.

Descriptors: \*Farm management, \*Africa, \*Rice, \*Sierra Leone, Agricultural economics, Production, Manpower, Capital, Management methods, Land use, Output, Mathematical models, Estimating, Cost analysis.  
Identifiers: Model farms, AIDH.

The paper describes experiences in collecting data in West Africa for planning as well as other purposes. Suggestions are made as to how some methodological problems can be handled. Lessons are drawn mainly from a study of rice production in Sierra Leone. A stratified area sampling technique involving 240 farmers was used to secure input-output data for a linear programming study of the rice industry. General recommendations are made on methods of farm management and production. (Author modified abstract)

**PB-219 734** PC A04/MF A01  
National Fertilizer Development Center, Muscle Shoals, Ala.  
**Tailoring of Fertilizers for Rice.** (633.18-T297b).  
Final rept. 1968-1972  
O. P. Engelstad, J. G. Getsinger, and P. J. Stangel. 1972, 57p AID-633.18-T297b  
Contract PASA-RA(QA)5-69

Descriptors: \*Rice plants, Fertilizers, \*Fertilizers, Evaluation, Inorganic nitrates, Phosphorus inorganic acids, Zinc inorganic compounds, Tropical tests, Field tests.  
Identifiers: AIDH.



## APPROPRIATE TECHNOLOGY ABSTRACTS

The agronomic activities under this project included basic research and preliminary evaluation of new fertilizers for rice at TVA in Alabama and by field studies in India, Thailand, Ceylon, the Philippines, Peru, Brazil and Columbia. The materials tested included various forms of nitrogen, phosphate and zinc. (Author Modified Abstract)

**PB-219 735** PC A02/MF A01  
National Fertilizer Development Center, Muscle Shoals, Ala.  
**Potential Fertilizers for Developing Countries. (631.8-T297a).**  
Summary rept. Jul 68-Jul 72.  
Aug 72, 20p AID-631.8-T297a  
Contract PASA-TA(QA)-6-69

Descriptors: \*Fertilizers, Developing countries, Evaluation, Ureas, Phosphate inorganic acids, Phosphate deposits, Sulfates, Tropical regions.  
Identifiers: AIDH.

The report presents a brief summary of tests recently made or in progress for production of several potential fertilizer materials that may have application in developing countries. Such materials include urea-phosphate rock, urea-single superphosphate based materials, urea-ammonium sulfate, granulated rock phosphate and improved urea. Emphasis is placed on the use of urea since it is now and will continue to be the most important nitrogen source in developing countries. Tests thus far are promising for development of a coating material which will improve the physical characteristics of urea used under tropical conditions. (Author Modified Abstract)

**PB-219 739** PC A04/MF A01  
Auburn Univ., Ala. Dept. of Fisheries and Allied Aquacultures.  
**Aquacultural Survey in Japan. (Ja-639.3-S355).**  
H. R. Schmittou. 1 Feb 72, 73p AID-JA-639.3-S355  
Contract AID/csd-2780

Descriptors: \*Aquaculture, \*Japan, Fisheries, Oysters, Shrimps, Shellfish, Water pollution, Cost factors, Evaluation.  
Identifiers: AIDH.

The purpose of this survey was to assess the value of Japan's aquacultural methods in terms of direct or indirect application in other countries, and to evaluate present and future status of aquacultures in Japan. The aquacultures discussed are: Ayu, Japanese eel, Yellowtail, Japanese oyster, and the Japanese Kuruma shrimp. Japan is faced with serious problems in most of its aquacultures. Only few of the methods of culture developed can be applied in other countries. If present methods are continued, many cultures will suffer limited growth and some may decline. The most serious problem and the ultimate limiting factor is the cost of production. Feed and labor are the two primary cost items of all cultures. Pollution is another problem. Another problem is having to depend on natural populations for young animals for stocking. A potential disease problem results from the feeding of uncooked trash fish also, and this particular problem has manifested itself in the yellowtail culture. Various stocking programs and ways to artificially reproduce fish stocks are discussed. (Author Modified Abstract)

**PB-219 740** PC A03/MF A01  
National Fertilizer Development Center, Muscle Shoals, Ala.  
**Ammonia-Urea Solution for Ammoniation-Granulation in Brazil. (Br-668.62-A179).**  
Frank P. Achorn, and Owen W. Livingston. Jun 72, 35p AID-BR-668.62-A179  
Contract PASA-TA(QA)-6-69

Descriptors: \*Fertilizers, \*Manufacturing, \*Granulation, Fertilizers, Solutions, Ammonia, Urea, Grinders, Handbooks, Inorganic phosphates.  
Identifiers: AIDH.

Many countries are considering alternative methods for increasing the output of fertilizers and fertilizer intermediates. Numerous studies have been made for various countries surveying alternative production schemes which could be utilized. The

report gives details of granulation process based on the ammoniation of superphosphates with ammonia-urea solution in a rotary-type drum granulator. Granulation is a process whereby rounded or spherical particles are produced through a fusion, solution, crystallization, or cementing process between various materials. To obtain spherical particles, it is necessary to impart a rolling-type action to nuclei; these nuclei serve as a base for building larger particles which grow to product size. Information for this report is based on actual experience during startup and operation of a plant in Porto Alegre, Brazil. The ammoniation-granulation plant there consists of a volumetric-type solid feed system, ammonia-urea solution feed system, TVA drum ammoniator-granulator, dual pan granulators, dryer, cooler, and screening system. Data are given to illustrate the possibility of grades that can be made for a plant of this type. (Author modified abstract)

**PB-219 741** PC A05/MF A01  
North Carolina State Univ., Raleigh. Dept. of Soil Science.  
**Soil Nitrogen: Supply Processes and Crop Requirements. (631.42-B287).**  
W. V. Bartholomew. Oct 72, 87p Technical Bull-6, AID-631.42-B287  
Contract AID/la-464  
Report on International Soil Fertility Evaluation and Improvement Program.

Descriptors: \*Soil fertility, Nitrogen, \*Grains(Food), Soil fertility, Fertilizers, Plant growth, Rainfall, Production capacity, Soil properties, Availability, Nitrites.  
Identifiers: AIDH.

Nitrogen use in modern agriculture has increased greatly with the growth of population and in turn the need for increased food production. Of all the soil elements essential for plant growth, nitrogen is the most likely to limit crop growth. Attention is focused on some of the principles affecting nitrogen availability and use which provide for maximum efficiency in the production of cereal crops. In forecasting fertilizer nitrogen needs, several use factors are collectively evaluated. Crop requirements are determined first. The kind of crop, expected yield, amount of nitrogen absorbed and used by the plants at the projected yield level. Expected yield levels depend mostly on soil properties and climatic factors. The amount of nitrogen expected from the soil and natural resources are assessed through mineralization, biological fixation, and additions from rainfall. An evaluation of all these processes are obtained by measuring the yield of a crop when no nitrogen fertilizer has been applied. (Author Modified Abstract)

**PB-219 744** PC A07/MF A01  
Yale Univ., New Haven, Conn. Economic Growth Center.  
**The Relevance and Prospects of Small Scale Industry in Colombia. (Co-338.64-B534).**  
Discussion paper  
Albert Berry. 25 Apr 72, 139p EGC-DP-142, AID-CO-338.64-B534  
Contract AID/csd-2492

Descriptors: \*Industrial relations, \*Colombia, \*Productivity, \*Scale(Ratio), Plants(Industries), Magnitude, Economic surveys, Statistical analysis, Development, Efficiency, Labor relations, Policies, Predictions.  
Identifiers: \*Small businesses, Technological development, AIDH.

There is a shortage of documented information on Colombia's small scale industry. An approach utilized here focuses on, (1) the historical development (with emphasis on the last 20 years) of small scale production, (2) management performance in terms of the actual and potential efficiency with which converts resources into output, (3) the growth tendencies of plants and firms over a period of time according to their sizes, (4) the relative factor productivity compared to larger industry, and (5) possible strategies for the success of this form of production. The data indicate that small and medium plants are on somewhat higher output/capital ratios than larger ones. (Author Modified Abstract)

**PB-219 747** PC E99/MF A01  
National Fertilizer Development Center, Muscle Shoals, Ala.  
**More Wheat from Fallow Farming. (Tu-633.11-H529).**  
Research rept.  
Homer M. Hepworth. Jan 73, 55 AID-TU-633.11-H529

Descriptors: \*Wheat, Production capacity, \*Soil water, Wheat, Water storage, Conservation, Soil erosion, Weed control, Fertilizers, Climate, Cultivation, Statistical data, Agronomy, Turkey.  
Identifiers: Following, AIDH.

Statistics show that wheat production varies widely even in areas of the same climatic conditions. Research conducted by National Wheat Improvement Center provides necessary information and production sources for optimum wheat production in the shortest possible time. It is observed that moisture conservation in soil (fallow system) with other improved agronomic practices can produce the optimum yield capacity. An effective fallow system involves storing water when it comes as rain or snow and minimizing losses prior to planting the crop. Research and training programs are designed to adapt improved technology to local conditions. Also presented is an analysis of the approach taken to facilitate the transfer of technology to local conditions in Turkey. (Author Modified Abstract)

**PB-219 757** PC A04/MF A01  
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.  
**Economic Analysis of Agricultural Production and Labour Utilization among the Hausa in the North of Nigeria. (Afr-338.1-N842).**  
African rural employment study Apr 66-Mar 67  
D. W. Norman. Jan 73, 53p AREP-4, AID-AFR-338.1-N842  
Grant AID/csd-3625  
See also report dated Sep 72, PB-219 730.

Descriptors: \*Agriculture, \*Nigeria, \*Farm management, Surveys, Communities, Rural areas, Data acquisition, Classifications, Land use, Manpower, Seasonal variations, Financing, Income, Statistical data, Linear programming, Farm crops.  
Identifiers: Zaria(Nigeria), AIDH.

A case study examines the farming practices and production of Moslem farmers in the Zaria area of Northern Nigeria. Three Moslem villages were selected; Hanwa, which borders on Zaria itself, Doka, and Dan Mahawayi. The results of the study were derived from 42 farming families in Dan Mahawayi and 62 families in the other 2 villages. Data were secured on land and labor; seasonality of farming and off-farm occupations; farm capital goods and cash expenses; acres, yields and location of food and cash crops; composition of farm and family income; and comparative statistics for large and small farms in the three villages. (Author modified abstract)

**PB-219 758** PC A12/MF A01  
North Carolina State Univ., Raleigh. Dept. of Soil Science.  
**A Review of Soils Research in Tropical Latin America. (Lat-631.4072-N864).**  
Review rept. Jul 70-Jul 72  
P. A. Sanchez, W. V. Bartholomew, S. W. Buol, F. R. Cox, and E. J. Kamprath. 1972, 272p AID-LAT-631.4072-N864  
Contract AIDcsd-2806

Descriptors: \*Soil surveys, Latin America, \*Tropical regions, Soils, Reviews, Soil properties, Investigations, Soil classification, Morphology, Food, Farm crops, Soil fertility, Cultivation, Acidity, Soil texture, Fertilizers, Nitrogen, Phosphorus, Potassium.  
Identifiers: AIDH.

The publication is a comprehensive review of the available literature on soils research in the American tropics. This area comprises all countries of Latin America and the Caribbean excluding Argentina, Chile and Uruguay. A search was made of biological abstracts for work in the region. Approximately 1,000 abstracts were obtained on research published since 1960. Additional materials were



obtained from Tropical Abstracts, the Latin American Bibliography of Agriculture and the authors' personal files. Emphasis is placed on the main food and feed crops of tropical America grown by small and medium sized farmers. The review covers the following topics of soil research: soil genesis, morphology and classification; soil physical properties; soil management under shifting cultivation; soil nitrogen in the tropics; nitrogen fertilization; soil acidity and liming; potassium; phosphorus; sulfur; and micronutrients. (Author)

**PB-219 759** **PC A02/MF A01**  
Cornell Univ., Ithaca, N.Y. Dept. of Agronomy.  
**Relationships among Physical and Chemical Properties of Representative Soils of the Tropics from Puerto Rico. (Rq-631.42-P555).**

Agronomy paper for Jun 69-Mar 73  
Warren R. Philipson, and Matthew Drosdoff. Mar 72, 6p Agronomy Paper-893, AID-RQ-631.42-P555  
Contract AID/csd-2490  
Pub. in Soil Science Society of America Proceedings, v36 n5 p815-819, Sep-Oct 1972.

Descriptors: \*Soil properties, Tropical regions, \*Puerto Rico, Soil properties, Soil surveys, Soil horizons, Regression analysis, Soil chemistry, Soil profiles, Soil water, Cation exchanging, Tables(Data).  
Identifiers: AIDH.

In an investigation of the extent to which predictive soil property relationships can be relied upon in characterizing soils of the tropics classified at the reconnaissance level, 9 to 15 soil properties, of 370 horizons, from 84 Puerto Rican profiles, were studied by correlation and multiple linear regression. The soils represented six orders of the new U.S. Soil Taxonomy (7th Approximation): Vertisols, Mollisols, Alfisols, Inceptisols, Ultisols, and Oxisols. Multiple regression equations were formed from the data of each order, with 15-bar moisture content, CEC, organic carbon, extractable iron, and base saturation as dependent variables. The results indicate that, although it is possible to eliminate certain properties from tropical soil data acquisition and still adequately characterize the soil, the specific properties that can be successfully eliminated depend on the soil order. (Author)

**PB-219 760** **PC A02/MF A01**  
Cornell Univ., Ithaca, N.Y. Dept. of Agricultural Economics.  
**New Seed Varieties and the Small Farm. (In-631.521-S346).**  
Rept. for Dec 70-Mar 72  
M. Schuller, and John W. Mellor. Jun 72, 22p  
AID-IN-631.521-S346  
Contract AID/csd-2805  
Also pub. as Cornell International Agricultural Development Reprint 52.

Descriptors: \*Seeds, Selection, \*Farm management, \*India, Farms, Production, Irrigation.  
Identifiers: AIDH.

The study explores the relationship that exists between adoption of the new seed varieties and size of farm for the small farmer in India. In this analysis a farmer is defined to have 'adopted' if he has put any part of his acreage under the new varieties. Tables are provided summarizing the results of the linear regression between proportion of farmers adopting the farm size for 70 cases. This analysis has been largely oriented to the adoption problems of the small farmer. Particular in the rice areas, among adopting farmers, the larger farmers seem to adopt on a smaller proportion of their acreage than the smaller farmers. The authors also discuss tenancy, irrigation, credit and uncertainty as factors affecting adoption. (Author Modified Abstract)

**PB-219 768** **PC A03/MF A01**  
Ohio State Univ., Columbus. Dept. of Agricultural Economics and Rural Sociology.  
**Technological Change and the Traditional Small Farmer of Rio Grande Do Sul, Brazil. (Br-631-R225).**  
Occasional paper  
Norman Rask. Jun 72, 37p Occasional Paper-85, AID-BR-631.R225  
Contract AID/csd-2501

Report on 'Studies in Agricultural Capital and Technology.'

Descriptors: \*Agricultural economics, \*Brazil, \*Economic development, Statistical data, Management methods, Land use, Farm crops, Livestock, Manpower, Demographic surveys, Education, Income, Communities.  
Identifiers: \*Technological change, \*Small farmers, Rio Grande do Sul(Brazil), Lajeado(Brazil), AIDH.

The paper concerns research on the determination and evaluation of capital formation and the relationship of this process to technological change and economic development for the small farmer of Rio Grande Do Sul in Brazil. The author provides a general background of the geographic region and settlement patterns and a general description of small farm agriculture as it is practiced in this Brazilian state. The study reports on rates of technological change on farms as related to farm size, technology available, and institutional settings. Findings are related to those for large farms. A case study of more than 6500 small farms located in the municipio of Lajeado is presented. (Author Modified Abstract)

**PB-219 772** **PC A03/MF A01**  
Yale Univ., New Haven, Conn. Economic Growth Center.

**Rural-Urban Migration, Urban Unemployment and Underemployment, and Job Research Activity in Ldcs. (331.127-F461).**

Discussion paper  
Gary S. Fields. Dec 72, 29p EGC-DP-168, AID-331.127-F461  
Contract AID/csd-2492

Descriptors: \*Unemployment, \*Developing countries, Urban areas, Mathematical models, Population migrations, Rural areas.  
Identifiers: Underemployment, AIDH.

A formal theoretical model is presented, with which the equilibrium allocation of the labor force between labor markets is analyzed. Following the model of Harris and Todaro, the focus is on the voluntary movement of workers between labor markets as the equilibrating force, instead of the more conventional mechanism of wage adjustment. Four additional factors are considered: a more generalized account of the process of search for urban jobs; favoring of educated workers over uneducated workers by employers in hiring; the possibility of unemployment in the so-called 'murky sector'; and recognition of labor turnover in a multi-period framework. Results are compared with predictions by Harris and Todaro. Urban unemployment rates were found to be considerably lower than predicted by the Harris-Todaro model. The theory of quantity adjustment being the equilibrating mechanism in labor markets is considered. Results presented demonstrate that the resulting framework gives predictions that are closer to actual experience than the Harris-Todaro model.

**PB-219 774** **PC A07/MF A01**  
North Carolina Univ., Chapel Hill. Dept. of Environmental Sciences and Engineering.  
**Planning Small Water Supplies in Developing Countries. (628.72-L384).**  
Final rept. Jul 69-Jul 72  
Donald T. Lauria. 1972, 141p AID-628.72-L384  
Contract AID/csd-2494

Descriptors: \*Water supply, Developing countries, Water resources, Community development, Management, Economic models, Benefit cost analysis, Demand(Economics), Supply(Economics), Construction, Central America.  
Identifiers: AID.

The research included two principal objectives: (1) develop a theoretical planning model for deciding water supply timing and scale in small communities of developing countries; (2) initiate field studies to obtain data on the parameters of the model to make it operational. The work of model development had to focus on several communities instead of only one. Additionally, time in the model had to be made discrete because budgets are imposed at fixed points in time. Finally, the model had to include the considerations of Manne's model pertinent to developing countries: economies of scale, water supply benefits, increasing demand, the discount rate, etc. While the first research objective is theoretical, the second is primarily applied. It was proposed to obtain at least preliminary information on water demand patterns in small communities, costs of water system construction, the economies of scale of water systems abroad, and by imputing, the benefits of publicly supplied water. All of the field data were obtained from Central America. (Author)

nent to developing countries: economies of scale, water supply benefits, increasing demand, the discount rate, etc. While the first research objective is theoretical, the second is primarily applied. It was proposed to obtain at least preliminary information on water demand patterns in small communities, costs of water system construction, the economies of scale of water systems abroad, and by imputing, the benefits of publicly supplied water. All of the field data were obtained from Central America. (Author)

**PB-219 777** **PC A03/MF A01**  
Harvard Univ., Cambridge, Mass. Center for International Affairs.

**A Subjective Equilibrium Theory of Share Tenancy. (333.53-W286).**

Economic rept., 31 May 67-Oct 72  
Peter Warr. Oct 72, 31p Economic Development-222, AID-333.53-W286  
Contract AID/csd-1543

Descriptors: \*Agricultural economics, \*Developing countries, \*Land use, \*Economic analysis, Reviews, Economic development, Production, Uncertainty principle, Allocations, Policies, Labor relations.  
Identifiers: Sharecropping, Tenancy, Resource allocation, Land reform, AIDH.

An economic development report reviews the analytics of share tenancy for land reform and other aspects of agricultural policy in the developing nations. Section 1 discusses the comparative statics of resource allocation under share-cropping, fixed rent tenancy, and capitalist production using wage labor. The implications of production uncertainty are treated in section 2 and are related to the conclusions of the previous section. Production uncertainty is shown to modify the comparative static conclusions on resource allocation and to provide an explanation for the existence of share-cropping despite its alleged inefficiency. (Author)

**PB-219 778** **PC A06/MF A01**  
Economic Research Service, Washington, D.C.  
**Agricultural Development and Farm Employment in India. (In-630.954-S798).**  
William J. Staub. Jan 73, 122p AID-IN-630.954-S798  
Pub. as Foreign Economic Rept. no. 84.

Descriptors: \*Farm management, Employment, \*India, Farm management, Agricultural machinery, Expenses, Fertilizers, Seeds, Rice plants.  
Identifiers: Agricultural development, AIDH.

The 'green-revolution' has come to Asia, but Indian workers have nothing to fear from technology. This study finds increased use of modern purchased inputs generates an increase in the amount of labor employed per farm. The various inputs investigated are: (1) farm size, (2) irrigation expenses, (3) investment in farm machinery, (4) bullock labor, (5) expenses for seed and fertilizer, (6) percentage of high-yield varieties used, (7) price of the dependent variable, and (8) the amount of human labor employed other than that included in the dependent variables. These factors were applied to Ferozepur and Thanjavur in the States of Punjab and Tamil Nadu, respectively, because of their similarity to other regions in India. (Author modified abstract)

**PB-219 950/3** **PC A02/MF A01**  
Washington State Univ., Pullman.  
**Waste Treatment for Small Flows**  
J. F. Kreissl. 1971, 25p  
Presented at the Annual Meeting American Society of Agricultural Engineers, Washington State Univ., Pullman, Wash., 27-30 June 1971.

Descriptors: \*Sewage treatment, \*Rural areas, Cost estimates, Water pollution, Septic tanks, Aerobic processes, Sanitary sewers, Force mains, Sewage disposal.  
Identifiers: EPASW.

The report surveys the problems of waste treatment in rural areas. It describes various treatment alternatives and gives cost estimates.



# APPROPRIATE TECHNOLOGY ABSTRACTS

**PB-219 980/0** PC A03/MF A01  
Alaska Univ., College. Inst. of Water Resources.  
**Sludge Production and Disposal for Small, Cold Climate Bio-Treatment Plants**  
Completion rept.  
Timothy Tilsworth. Dec 72, 50p IWR-32, OWRR-A-033-ALAS(2)  
Contract DI-14-31-0001-3202, DI-14-31-0001-3502

Descriptors: \*Sludge drying, \*Freezing, \*Sewage treatment, Sludge disposal, \*Dewatering, \*Sludge disposal, Design criteria, Sand filtration, Aeration, Activated sludge process, Cost estimates, Water pollution.  
Identifiers: \*Sludge treatment, OWRR.

A sludge disposal process consisting of modified sand drying beds in combination with the freeze-thaw technique utilizing natural refrigeration was evaluated. The purpose of freeze-thawing of sewage sludge is principally to condition the sludge such that it is readily dewaterable and, subsequently, results in a reduced volume of solids to be further processed. The study consisted of three separate evaluations using three model drying beds for each respective run. Two of the beds were studied at sludge depths of six inches, and the third bed was evaluated at an eighteen-inch sludge depth. Settled activated sludge for placement on the model beds was obtained from the sedimentation tank of a local activated sludge plant.

**PB-220 300/8** PC A02/MF A01  
Illinois State Water Survey, Urbana.  
**Removal of Algae from Waste Stabilization Pond Effluents - A State of the Art**  
V. Kothandaraman, and Ralph L. Evans. 1972, 13p\* Rept no. ISWS-72-CIR-108

Descriptors: \*Algae, \*Waste treatment, \*Harvesting, Algae, Lagoons(Ponds), Precipitation(Chemistry), Filtration, Clarification, Flotation, Centrifuging, Dewatering, Fertilizing, Feeding stuffs, Manufactured gas, Methane, Drying, Concentrating, Sewage treatment, Industrial waste treatment.  
Identifiers: Microstraining, Anaerobic lagoons, Aeration ponds, Water pollution control, ISWSD.

Treatment of municipal, industrial, and agricultural wastes employing stabilization ponds or lagoons has found increasing application within the past 20 or 30 years. Regardless of whether the lagoon is an oxidation pond, an anaerobic cell followed by an aerobic polishing pond, or a facultative lagoon, the effluent from each facility is likely to contain a significant concentration of algae. With the adoption of wastewater effluent standards by water pollution abatement agencies, particularly with respect to suspended solids and biochemical oxygen demand, it becomes imperative either to design the oxidation pond facilities on a total wastewater retention basis or to provide means for separating the algae from pond effluents and disposing of the harvested residue. This report summarizes the investigations of other research workers concerning methods of harvesting algae and disposing of that harvest, and should be helpful to consulting engineers and stream pollution abatement agencies. Since several of the separation techniques employed in these investigations are physiochemical processes, a brief introduction to the algal cell wall characteristics is presented before discussing the algal removal methods. (Modified author abstract)

**PB-220 349/5** PC A18/MF A01  
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.  
**Irrigation Efficiency. A Bibliography**  
Apr 73, 423p WRSIC-73-214, W73-09115

Descriptors: \*Irrigation, Bibliographies, \*Sprinkler irrigation, Efficiency, Abstracts, Policies, Management, Water supply, Design, Arid land, Farm crops, Evapotranspiration, Salinity, Soil water, Water conservation, Utilization, Water consumption, Indexed(Documentation).  
Identifiers: OWRR.

The report, containing 272 abstracts, is another in a series of planned bibliographies in water resources to be produced from the information base comprising SELECTED WATER RESOURCES ABSTRACTS (SWRA). At the time of search for this bibliography, the data base had 53,230 abstracts covering SWRA through February 15, 1973 (Volume 6, Number 4). Author and subject indexes are included. (Author)

**PB-220 525/0** PC A03/MF A01  
Abt Associates, Inc., Cambridge, Mass.  
**A Study of Rural Cooperatives: Summary Volume**  
Final rept. 1 Jul 71-28 Feb 73  
William L. Hamilton. Feb 73, 37p OEO-LN-1368  
Contract OEO-BIC-5296  
Paper copy also available from NTIS \$4.75/set of 2 reports as PB-220 524-SET.

Descriptors: \*Rural areas, Marketing, \*Economic development, Rural areas, Commerce, Reviews, Benefit cost analysis, Classifications, Socioeconomic status, Requirements, Objectives, Recommendations, Policies.  
Identifiers: \*Rural cooperatives, OEO.

An analysis is presented of rural cooperatives as a program to provide economic and non-economic benefits to low-income members and the rural community. (Author)

**PB-220 526/8** PC A13/MF A01  
Abt Associates, Inc., Cambridge, Mass.  
**A Study of Rural Cooperatives: Analysis**  
Final rept. 1 Jul 71-28 Feb 73  
William L. Hamilton. Feb 73, 279p OEO-LN-1369  
Contract OEO-BIC-5296  
Paper copy also available from NTIS \$4.75/set of 2 reports as PB-220 524-SET.

Descriptors: \*Rural areas, \*Marketing, \*Economic development, Rural areas, Commerce, Benefit cost analysis, Socioeconomic status, Community development, Policies, Data acquisition, Management.  
Identifiers: \*Rural cooperatives, OEO.

The study is designed to answer questions dealing with developing and structuring programs of support to cooperatives. These questions involve the goals coops set, and how they are articulated, the different strategies a low-income coop may follow, and those which work best in various situations, the effectiveness of the low-income coops in accomplishing the goals they select, the internal and external factors related to success in delivering benefits, and the type and level of support low-income cooperatives need.

**PB-220 764/5** PC A05/MF A01  
Arkansas State Highway Dept.  
**Maintenance Scheduling and Reporting**  
Aug 72, 100p  
Prepared in cooperation with Roy Jorgenson and Associates, Inc., Gaithersburg, Md.

Descriptors: \*Highways, \*Maintenance, \*Scheduling, \*Manuals, Management methods, Supervisors, Reporting, Operations, Vocational guidance, Management training, Adaptive systems.  
Identifiers: \*Superintendents, \*Foremen, FHAPR.

The report describes most of the field procedures of the Arkansas Highway Department's maintenance management system. The material is specifically designed for area foremen and job superintendents. Included are work scheduling, management tools, procedures, and reporting. The format is suitable for use as a self-instructional text.

**PB-220 825/4** PC A06/MF A01  
National Academy of Sciences, Washington, D.C.  
**Ferrocement: Applications in Developing Countries**  
Panel study.  
Feb 73, 105p  
Contract AID/csd-2584  
Summaries in French and Spanish. Library of Congress Catalog Card No. 73-4027.

Descriptors: \*Reinforced concrete, \*Developing countries, \*Wire cloth, Reinforced concrete, Boats, Food industry, Equipment, Roofing, Evaluation, China, Silos, Construction materials, Thailand, Ethiopia, New Zealand.  
Identifiers: \*Ferrocement, NASNAE.

An ad hoc panel was convened to concentrate on three specific tasks: (1) evaluating the current state of the art of ferrocement as an engineering material; (2) evaluating the principal areas of application on both land and water; and (3) developing specific recommendations for promoting the use of ferrocement in a logical, effective manner. Specific areas covered in the report include: ferrocement for boatbuilding; for food-storage facilities; for food-processing equipment; for low-cost roofing; and materials technology. Appendices discuss Ferrocement boatbuilding in a Chinese commune; Ferrocement food storage in Thailand; Ferrocement-lined underground grain silos in Ethiopia; and New Zealand ferrocement tanks and utility buildings.

**PB-221 096/1** PC A06/MF A01  
Louisiana State Univ., Baton Rouge. Dept. of Chemical Engineering.  
**Single Cell Proteins from Cellulosic Wastes**  
Final rept.  
C. D. Callihan, and C. E. Dunlap. 1973, 105p\*  
EPA-6702-73-02  
Grant PHS-EC-00328

Descriptors: \*Solid waste disposal, Cellulose, \*Cellulose, \*Fermentation, \*Agricultural wastes, \*Food processing, \*Bagasse, Solid waste disposal, Proteins, Biodeterioration, Drying, Process variables, Cost estimates, Pilot plants, Utilization, Sugar cane.  
Identifiers: \*Food supplements, \*High protein supplements, Hyperfiltration, NERC.

The need for protein feed and the need to dispose of waste cellulose are problems being studied to develop a feasible method for the direct conversion of cellulosic wastes to microbial protein—a single cell protein to be used as an animal feed supplement. This report presents data on the process and summarizes research in large-scale production. The economics and techniques of the conversion process are compared with work done by petroleum companies on the fermentation of hydrocarbons. Controlling variables used in the process are defined and significant goals necessary to achieve success in the field are described. The research deals mainly with the alkali treatment and fermentation parts of the process. Different micro-organisms from which single cell protein can be produced are given. Research in the areas of cell flocculation, flotation, or hyperfiltration are recommended to improve the most costly single step of the process—drying the cells. Methods of decreasing the degree of crystallinity are also included. The practicality of complete acid hydrolysis of cellulose to a soluble substrate for conversion to yeast protein and partial acid hydrolysis of the cellulose followed by microbial consumption is discussed. An economic analysis is given of the potential markets and the competitive cost with other proteins. (Modified author abstract)

**PB-221 142/3** PC A07/MF A01  
Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Mechanical Engineering.  
**Special Topics. Human Powered Transit; Remote Medical System; Water Treatment**  
Final rept.  
John C. Purcupile. May 73, 130p\*  
Contract HUD-H-1558  
See also PB-215 071.

Descriptors: \*Bicycles, Research, \*Medical services, Trailers, \*Potable water, Water treatment, \*Urban planning, Research, Design, Roads, Central city, Medical equipment, Osmosis, Urban areas, Rural areas.  
Identifiers: OUTR.

The report includes final results of project presented in the December 17, 1971 publication, The New City, which addresses the useful application of technology to solving urban problems. Topics include: (1) Human Powered Transit - examines elements of a human powered system: human power



output, vehicle design, roadway design, and potential areas for the system such as a CBD, campus, and planned community; (2) Remote Medical System - develops a conceptual design of a system using mobile vans, paramedics and telecommunication to provide health services in geographically remote or in inner city areas and includes a bibliography; (3) Water Treatment System - designs and builds an inexpensive water treatment system using the principle of reverse osmosis to provide safe drinking water in rural areas. This system will be introduced by Peace Corps and Vista workers in appropriate areas.

**PB-221 171/2** PC A05/MF A01  
Colorado State Univ., Fort Collins, Dept. of Avian Sciences.  
**Biological Conversion of Animal Wastes to Nutrients**  
Byron F. Miller. Jun 73, 82p\* EPA-670/2-73-09  
Grant EP-00262

Descriptors: \*Agricultural wastes, \*Solid waste disposal, \*Materials recovery, Agricultural wastes, \*Poultry, Feeding stuffs, \*Muscidae, \*Feeding stuffs, Biodegradation, Temperature, Humidity, Chickens, Chemical analysis, Air pollution, Water pollution, Amino acids, Larvae, Utilization, Metabolism.  
Identifiers: Waste recycling, \*Manure, Catabolism, *Musca domestica*, ORM.

As part of studies to determine how living organisms may be used to catabolize poultry manure, larvae of house flies (*Musca domestica*) were used to process poultry manure, with the pupae being used as a feed supplement. Temperature and relative humidity conditions were determined to produce an optimum yield of dry pupae. Three feeding trials were conducted to evaluate fly pupae and catabolized poultry manure residue as protein sources for growing chickens. White Leghorn chicks, White Plymouth Rock chicks, and New Hampshire and Indian River broiler chicks were fed the various diets and differences in body weight and feed conversion were recorded. The results indicated that fly pupae have potential as a protein supplement in chick starter and broiler diets; the protein quality was found to be similar to that of meat and bone meal or fish meal, and superior to soybean oil meal.

**PB-221 282/7** PC A02/MF A01  
Commonwealth Scientific and Industrial Research Organization, Melbourne (Australia). Div. of Applied Chemistry.  
**Pulping of Tropical Hardwoods: Individual and Mixed Species, Wood and Paper Properties, Resource Assessment**  
H. G. Higgins, F. H. Phillips, A. F. Logan, and V. Balodis. 1973, 25p Rept no. Technological paper-70  
International Standard Book no. 0-643-00071-2.

Descriptors: \*Wood pulp, \*Hardwoods, Resources, Tropical regions, Evaluation, Sampling, Test methods, Simulation, Density(Mass/volume), Kraft paper, Containers, Papers, Australia.  
Identifiers: Papua(New Guinea), Rain forests, CSIRO.

Mixed tropical hardwoods from Papua New Guinea provide unbleached pulps suitable for use in linerboards, bag and sack papers, wrapping paper, and corrugating medium, and bleached kraft pulps from some resources may be suitable also for high-grade printing and writing papers. In forest sampling the resource should be stratified on the basis of a forest inventory. Three approaches to evaluation have been adopted: (1) pulping tests on a representative wood sample, (2) tests on a simulated sample from the major species, and (3) construction of a 'theoretical' sample from measurements of basic density and pulping results on individual species. (Modified author abstract)

**PB-221 494/8** PC-GPO/MF A01-NTIS  
Caldwell Lacey Leather Co., Auburn, Ky.  
**Secondary Waste Treatment for a Small Diversified Tannery**  
Environmental protection technology series  
E. L. Thackston. Apr 73, 82 EPA-R2-72-209  
Grant FWPCA-WPRD-25-01

Paper copy available GPO \$1.25 as EP1.23/2-73-209.

Descriptors: \*Industrial waste treatment, \*Tanning materials, \*Water pollution, Tanning materials, Activated sludge treatment, Leather, Design, Performance evaluation.  
Identifiers: \*Tanneries, \*Water pollution control, Biological industrial waste treatment, ORM.

The Caldwell Lacey Leather Co. of Auburn, Kentucky, a small tannery using primarily alum tanning but some chrome and vegetable tanning, received a demonstration grant to investigate and demonstrate methods of treating tannery wastes for discharge to a small stream. A research contract with Vanderbilt University produced findings which have previously been reported and are reviewed herein. A modified completely-mixed activated sludge plant was constructed, along with facilities to handle specific problem wastes. After it had been operating for a year, an EPA survey team conducted a study which showed that the plant was performing as predicted by the research phase, except for solids carryover from the secondary clarifier due to mechanical problems. After the problems were corrected, the plant began producing an effluent which more than met expectations, removing 97% of the suspended solids and 95% of the BOD. The report reviews the characteristics of the wastes and discusses the treatment process.

**PB-221 876/6** PC A09/MF A01  
Oregon State Univ., Corvallis. Dept. of Forest Products.  
**Utilization of Bark Waste**  
Final rept.  
R. A. Currier, and M. L. Laver. Jul 73, 184p EPA-670/2-73-005  
Grant EPA-R-EP-00276-4

Descriptors: \*Wood wastes, Utilization, \*Bark, \*Solid waste disposal, Materials recovery, Industrial wastes, Chemical composition, Pelletizing, Fertilizers, Physical properties, Plastics, Solvent extraction, Wood products.  
Identifiers: NERC.

The problem of bark waste that is generated by the forest products industry in the United States has become increasingly important. The major overall goal of the work covered in this report was to use physical and chemical sciences in coordinated studies to promote economic uses of bark in order to relieve pollution created by present methods of disposal. Physical utilization research included: investigating the preparation of bark pellets from bark; determining the components responsible for 'self-bonding' of bark; and investigating potential products from or applications of bark wastes obtained from production sources. Chemical utilization research included: preparing, for chemical studies, natural bark, bark that had been ammoniated to contain 4 percent nitrogen, and bark that had been molded into pellets and then broken down into small particles; and investigating the chemical composition of each type of bark prepared.

**PB-222 331/1** PC A02/MF A01  
Hawaii State Dept. of Planning and Economic Development, Honolulu. State Center for Science Policy and Technology Assessment.  
**A Solid Waste Primer. Facts and Statistics on Solid Waste Handling Disposal**  
Ginger Plasch. 28 Jan 72, 11p  
Grant NSF-GT-25  
Presented at Solid Waste Recycling Conference, Honolulu, Hawaii, 27-28 Jan 72.

Descriptors: \*Solid waste disposal, \*Hawaii, Materials handling Cost estimates, Legislation, Waste disposal.  
Identifiers: NSF.

This short primer provides (a) a description of methods of handling and disposing of solid waste materials, (b) solid waste information and statistics concerning Oahu, (c) capsule information on Hawaii State legislation, and (d) some definitions of types of solid waste and methods of disposal. (Author)

**PB-222 422/8** PC A04/MF A01  
Florida Univ., Gainesville.  
**Composted Municipal Refuse as a Soil Amendment**  
Final rept.  
C. C. Hortenstine, and D. F. Rothwell. Aug 73, 67p\* EPA-670/2-73-063  
Contract EP-00250

Descriptors: \*Solid waste disposal, Composts, \*Fertilizers, Composts, Refuse disposal, Plant growth, Germination, Nitrification, Grain sorghum plants, Tomatoes.  
Identifiers: Cranberry beans, Pearl millet, Turnips, NERC.

Processed residential refuse from four municipal composting plants was evaluated as a source of plant nutrients and as a soil amendment. Indicator plants were turnip, pearl millet, cranberry beans, tomato, and sorghum. Three of the composts used were high in carbon and low in nitrogen, which resulted in delayed nitrification accompanied by poor plant growth. Total soluble salts in those composts were relatively high and could affect seed germination. Extracts of compost (160 g/500ml H<sub>2</sub>O) greatly reduced germination in radish and turnip seed, and extracts from 320 g compost/500ml H<sub>2</sub>O reduced germination to 0 in turnip and radish seed and to about 40 percent in oat and millet seed. After a period of time in the soil, compost applications above 32 metric tons/ha increased plant yields and improved soil cation exchange capacity and water-holding capacity. In laboratory studies with compost incorporated at various levels in Arredondo sand, almost no nitrification occurred. When mixed with cow manure in equal parts, compost effectively curtailed nitrification in the cow-manure almost 100 percent. (Modified author abstract)

**PB-222 441/8** PC A03/MF A01  
National Research Council, Bangkok (Thailand).  
**Workshop on Science Planning and Policy in Thailand, 3-6 July 1972**  
Final rept.  
Jul 72, 48p  
Contract AID/csd-2584  
Sponsored in part by National Academy of Sciences, Washington, D.C.

Descriptors: \*Research management, \*Thailand, Planning, Policies, Industries, Engineering, Natural resources, Utilization, Agriculture, Medicine, Public health, Meetings, Environmental engineering, Developing countries.  
Identifiers: AID.

The objective of the workshop was to consider the role of science and technology in relation to the development of Thailand, with particular emphasis on mechanisms for planning and implementing science policy in Thailand. Five working groups held discussions, and made recommendations, in the following areas: Industry and Engineering; Natural Resources and Utilization; Agricultural Production; Medicine, Public Health and Environmental Quality; and Academic Science.

**PB-222 454/1** PC A05/MF A01  
California Univ., Berkeley. Sanitary Engineering Research Lab.  
**Photosynthetic Reclamation of Agricultural Solid and Liquid Wastes**  
Ecological research series  
Clarence G. Golueke, William J. Oswald, Gordon J. L. Dugan, Charles E. Rixford, and Stanley Scher. Aug 73, 94p\* EPA-R3-73-031  
Grant EP-00272

Descriptors: \*Solid waste disposal, Agricultural wastes, \*Industrial waste treatment, \*Agricultural wastes, \*Water pollution, Agricultural wastes, \*Farms, \*Sewage treatment, Liquid waste disposal, Algae, Lagoons(Ponds), Sludge disposal, Feeding stuffs, Drying, Water reclamation, Materials recovery, Anaerobic processes, Fermentation, Pilot plants, Digestion(Decomposition), Performance evaluation, Houses.  
Identifiers: \*Water pollution control, Manure, Aeration ponds, NERC.

The overall objective of this study was to develop a system with which a large fraction of the wastes



produced by agricultural industries could be converted into a useful material without imposing an unacceptable burden on the environment. Specifically, the project involved a detailed study of the basic characteristics of an integrated anaerobic fermentation and algae growth system for agricultural solid and liquid wastes on a laboratory and small pilot plant scale, with special attention being devoted to the reaction kinetics of the system. A substantial degree of nutrient recovery and recycle was also attained in the system.

**PB-222 457/4** PC A06/MF A01  
National Academy of Sciences, Washington, D.C.  
**Workshop on Industrial and Technological Research. Volume III. Jakarta, Indonesia**  
Jane Wilkie, and Everett Lee. Jan 71, 120p  
OWRR-A-024-MASS(1)  
Contract AID/csd-2584  
Prepared in cooperation with Indonesian Inst. of Science (Lembaga Ilmu Pengetahuan Indonesia) Jakarta. See also Volume 1, PB-217 118, and Volume 2, PB-218 724.

Descriptors: \*Economic development, \*Indonesia, \*Meetings, \*Industrial relations, Project planning, Research, Development, Standardization, Quality control, Information systems, Management planning, Education, Specialized training, Growth, Developing countries.  
Identifiers: Research utilization, Workshops, Technological development, AID.

The concern of the workshop was the strategy for using research, development, and engineering to assist in achieving the desired industrial growth in Indonesia. Volume (1) presented the overall findings and recommendations, and Volume (2) gave the plenary sessions and working groups reports.

**PB-222 511/8** PC-GPO/MF A01-NTIS  
National Area Development Inst. of Spindletop Research, Inc., Lexington, Ky.  
**Improving Water Quality Management Planning in Nonmetropolitan Areas**  
Final 25 Apr-25 Aug 72  
E. Evan Brunson, John D. Leslie, and Edwin W. Webber. Jan 73, 69p\* EPA-68-01-0194  
Contract EPA-68-01-0194  
Paper copy available from GPO \$0.95 as EP1.2:W29/7.

Descriptors: \*Regional planning, \*Water quality, \*Rural areas, Water quality, \*Water pollution, Regional planning, Assessments, Local government, Management planning, State government, Communities, National government, Financing.  
Identifiers: Intergovernmental, OAP.

The report presents the results of a study which examined water quality management planning in nonmetropolitan areas. It presents recommended improvements reflecting both national policy and the diverse problems of these areas. The objective of the study was to assist EPA in adapting its requirements more closely to nonmetropolitan problems and to prescribe appropriate roles for other Federal and state agencies and substate planning and development organizations in the process. Three States - Oregon, Wisconsin and South Carolina - were selected, each containing several nonmetropolitan substate districts, and representing different intergovernmental approaches to water quality management planning and a significant amount of program activity by the four Federal agencies involved. They also presented sufficient commonality to provide valid general conclusions.

**PB-222 533/2** PC A02/MF A01  
National Bureau of Standards, Washington, D.C.  
**National Program of Metrology for Ethiopia**  
Thomas M. Stabler. 1972, 24p Rept no. NBS-10927  
Grant PASA-TA(CE)-5-71

Descriptors: \*Metrology, \*Ethiopia, Government policies, Project planning, Substitutes, Units of measurement, Standards, Personnel, Economic development.  
Identifiers: AID.

A national program of metrology for Ethiopia is discussed under the following headings: program and

alternatives; weights and measures proclamation and regulation; program plan; and personnel.

**PB-222 787/4** PC A05/MF A01  
National Academy of Sciences, Washington, D.C.  
**U.S. International Firms and R, D/E (Research, Development, and Engineering) in Developing Countries**  
1973, 89p  
Contract AID/csd-2584

Descriptors: \*Developing countries, Economic development, Research, Reviews, Organizations, Project planning, Factor analysis, Classifications.  
Identifiers: Multinational corporations, Less developed countries, Research development and engineering, AID.

A special panel convened in 1971 to examine the past and potential role of U.S. firms in strengthening the research, development, and engineering capabilities in developing countries, and identified the principal factors tending to promote or inhibit such a contribution. The report covers conflicts and possibilities for cooperation, problems in strengthening R, D and E in LDCs, the role of U.S. firms, views from five industries on their roles, and conclusions and recommendations of the panel.

**PB-222 920/1** PC A07/MF A01  
Highway Research Board, Washington, D.C.  
**Soil Stabilization**  
K. P. George. 1973, 132p Rept no. HRB-Record-442  
International Standard Book no. 0-309-02173-1, Library of Congress Catalog Card no. 73-11608.  
Paper copy also available from Highway Research Board, National Academy of Sciences, 2101 Constitution Ave., N. Y. Washington, D.C. 20418 \$4.00.

Descriptors: \*Soil stabilization, Research, \*Pavement bases, Soil stabilization, Sands, Tensile strength, Bitumens, Soil cement, Calcium oxides, Creep properties, Alkali aggregate reactions, Shear strength, Emulsions, Soil associations, Tropical regions, Foundations, Meetings.  
Identifiers: NASHRB.

Many aspects of stabilization of sand with cationic shrinkage cracking in soil-cement bases to stabilization of sand with cationic bitumen emulsion are discussed in papers presented at a conference on cracking of soil-cement held at the 52nd Annual Meeting of the Highway Research Board. Also presented are methods of improving the tensile strength of soil-cement, factors that affect the creep behavior of cement-stabilized soils, a method for predicting the freeze-thaw durability of stabilized materials, proposal of realistic cutoff dates for construction with lime-fly ash and lime-cement-fly ash mixtures, development of different indexes of lime reactivity for different soil groups, especially in tropical and subtropical areas, and effects of factors such as temperature and specimen age on the shear strength of sands stabilized with cationic bitumen emulsion.

**PB-223 266/8** PC A15/MF A01  
Academy for Educational Development, Inc., New York.  
**Technical-Economic Considerations in Public Service Broadcast Communications for Developing Countries**  
R. Butman, G. Rathjens, and C. Warren. 1973, 332p Rept no. 73-9  
Contract AID/csd-2829  
Prepared in cooperation with the Massachusetts Inst. of Technology.

Descriptors: \*Education, \*Developing countries, \*Television systems, Schools, \*Communication satellites, Education, Brazil, India, Ethiopia, Telecommunication, Economic factors, Policies, Cost analysis, Radio broadcasting, Services, Engineering.  
Identifiers: Satellite television systems, Technological development, AID.

The report represents the culmination of an inquiry into the distribution of educational material in developing countries, with particular attention to the problems and opportunities in Brazil and India. Emphasis on the use of television and satellites to dis-

tribute T.V. programming is a reflection of the interest in the use of satellite-T.V. systems in two countries. The report includes techno-economic factors, cost and policy considerations, comments on expanding radio and television broadcasting services in Ethiopia, and technical aspects of educational communication technologies.

**PB-223 310/4** PC A04/MF A01  
National Academy of Sciences, Washington, D.C.  
**Workshop on the Role of the Council for Scientific and Industrial Research in Determining Science Policy and Research Priorities**  
May 73, 65p  
Contract AID/csd-2584

Descriptors: \*Economic development, \*Ghana, \*Research, Developing countries, Scientific societies, Industrial engineering, Scheduling, Policies, Meetings, Recommendations, Universities.  
Identifiers: Workshops, Priorities, Research utilization, AID.

A workshop was convened, following the recommendations of a 1971 workshop in Ghana on research priorities, to consider how best the Council for Scientific and Industrial Research (CSIR), can discharge the functions assigned to it. The working group recommended that a science and technology planning and analysis group be established within the C.S.I.R.; and some principles which should influence the development of science and technology in Ghana. Recommendations for special studies in relation to development objectives and needs are given.

**PB-223 373/2** PC A07/MF A01  
Mississippi State Univ., State College. Water Resources Research Inst.  
**A Study of Managerial Practices in Rural Water Systems**  
Charles P. Cartee, and D. C. Williams, Jr. Jul 73, 133p\* OWRR-B-008-MISS(1)

Descriptors: \*Water supply, \*Management methods, \*Rural areas, \*Water services, Systems engineering, Standards, Growth, Requirements, Surveys, Inequalities, Operations, Maintenance, Operators(Personnel), Management analysis, Mississippi.  
Identifiers: OWRR.

The rural community water system program in Mississippi has grown until the systems total is now over 580, the second largest of all the states. Due to the rapid growth and changing demands and standards, a study of managerial practices was deemed appropriate. The emphasis is directed toward deficiencies in management. Also of concern were the relations of operating and maintenance costs per user to system size.

**PB-223 510/9** PC A06/MF A01  
North Central Forest Experiment Station, St. Paul, Minn.  
**Black Walnut as a Crop. Black Walnut Symposium, Carbondale, Illinois, August 14-15, 1973**  
Forest service general technical rept. (Final)  
Jul 73, 120p\* Rept no. FSGTR-NC-4

Descriptors: \*Nut trees, Research, \*Walnuts, Cultivation, Walnut wood, Plant genetics, Plant growth, Economic development, Marketing, Wood products, Plant reproduction, Protection, Meetings.  
Identifiers: \*Juglans nigra, Silviculture, FS.

The report contains 30 papers on black walnut presented at a symposium in Carbondale, Illinois, in August 1973. Subjects covered include black walnut resources, utilization, and marketing; silviculture; tree improvement; nut culture and production; protection; and economics.

**PB-223 999** PC A02/MF A01  
Kansas State Univ., Manhattan.  
**Improving Protein Quality of Millet, Sorghum, and Maize Diets by Supplementation**  
S. Pushpamma, D. B. Parrish, and C. W. Deyoe. 1972, 9p AID-664.06-P261  
Contract AID/csd-1586  
Pub. in Nutrition Reports International, v5 n2 p93-100 Feb 72. Also pub. as Kansas State Univ., Man-



## APPROPRIATE TECHNOLOGY ABSTRACTS

hattan. Dept. of Biochemistry Contrib-134, and Dept. of Grain Science and Industry Contrib-776. Identifiers: AIDH.

Nutritive value of the protein of millets (Bajra and Regi), sorghum, and maize was studied by amino acid analyses, by growth of rats and calculations of PER using diets containing the grains, unsupplemented or supplemented with lysine, tryptophan, or four protein concentrates. Ragi protein was highest in essential amino acids (EAA) except leucine, and compared to the FAO reference pattern, no amino acid in Ragi was limiting except lysine was marginal. Bajra protein was deficient in lysine; sorghum and maize were deficient in three or more amino acids. On several protein-quality scores, Ragi ranked first and Bajra second; both ranked considerably higher than sorghum or maize. Among unsupplemented diets, Bajra caused greatest weight gain in rats and had the highest PER. Supplementing Bajra and Ragi diets with lysine increased both gains and PER. Lysine improved sorghum and tryptophan improved maize diets; together lysine and tryptophan markedly improved both diets. Fish protein concentrate was the most effective supplement with sorghum and Ragi, dried milk with maize, and isolated soybean protein with Bajra.

**PB-224 025** PC A15/MF A01  
Agency for International Development, Washington, D.C.

**A.I.D. Spring Review of Small Farmer Credit. Volume I. Small Farmer Credit in Mexico and Central America**

Country papers.  
Feb 73, 341p Rept nos. AID-332.71-A265, SR-101

See also Volume 2, PB-224 026.  
Identifiers: AIDH.

The volume consists of five separate reports describing the program characteristics, evaluation and role of technical assistance regarding farm credit as it is institutionalized and practiced in four countries of Central America. The titles and authors of these reports are as follows: 'Guarantee and Development Fund for Agriculture, Livestock and Poultry' by Jorge Uriza Salgado; 'Credit Among Small Farmers--The Case of the Puebla Project of Mexico' by Heliodoro Diaz Cisneros; 'The Supervised Credit Program in El Salvador--1961 to the Present' by Ricardo A. Vasquez, Gustavo Solis and David E. Weisenborn; 'The National Bank of Honduras' by Reinaldo W. Santos; 'The Rural Credit Program of the National Bank of Nicaragua--Report on Credit to the Small Farmer in Nicaragua' by Carlos Rene Ramirez.

**PB-224 044** PC A06/MF A01  
Agency for International Development, Washington, D.C.

**A.I.D. Spring Review of Small Farmer Credit. Volume XX. Small Farmer Credit-Summary Papers**

Jun 73, 108p Rept nos. AID-332.71-A265s, SR-120

See also Volume 19, PB-224 043.  
Identifiers: AIDH.

For the Review, AID was able during the period June 1972 thru January 1973 to assemble a large number of comparable case studies drawn from different parts of the world, to analyze them, and to report on the lessons of experience. The research focused on three principal themes: The role of institutional credit in small farmer development; the major institutional alternatives for delivering small farmer credit; and certain policy issues, such as interest rates, that appear to be critical to the success of these programs. The tentative conclusions drawn from the research were refined during a series of ten field workshops in the spring of 1973 and are presented in summary form in this volume. The entire evaluation is limited by the fact that credit is only one of the factors in a small farmer development strategy, and, though the study found a handle on the broader subject, it cannot, in itself, recommend an overall solution to the small farmer problems.

**PB-224 212/1** PC A17/MF A01  
Environmental Protection Agency, Cincinnati, Ohio.

**Chemical Analyses for Water Quality. Training Manual**

Audrey E. Donahue. Feb 73, 394p\* Rept no. EPA-430/1-73-003

Descriptors: \*Water analysis, Manuals, \*Water pollution, Water analysis, Criteria, Acidity, Alkalinity, Dissolved gases, Oxygen, Ammonia, Nitrates, Nitrogen, Chlorine, Carbon, Calcium, Magnesium, Electrical resistivity, Phosphorus, Cyanides, Iron, Manganese, Phenols, Chlorine aromatic compounds, Detergents, Surfactants, Pesticides, Spectroscopic analysis, Flame photometry, Atomic spectroscopy, Organic compounds, Gas chromatography, Chromatography, Infrared spectroscopy, Automation, Aerial reconnaissance, Legal processes, Metals.

Identifiers: \*Water pollution detection, FWQA.

This training manual contains outlined information used by lecturers when presenting topics in EPA-NTC Course 100, 'Chemical Analyses for Water Quality.' The contents concern individual constituents found in water (e.g. dissolved oxygen), instrumental methodology (e.g., atomic absorption) and information useful to analysts (e.g., statistics). A section of laboratory procedures used by class groups is also included.

**PB-224 222** PC A05/MF A01  
Cornell Univ., Ithaca, N.Y. Dept. of Agricultural Economics.

**Capital Formation of the Ecuadorian Frontier: A Study of Human Investment and Modernization in the Riobambenos Cooperative**

Peter M. Gladhart. Apr 72, 78p A.E.Res-72-5, AID-EC-3338.1-G542

Contract AID/csd-2823

Identifiers: AIDH.

The agricultural production activities of spontaneous settlers is described in detail, with special focus upon the determinants of family income and investment and rate of capital formation. The cooperative Riobambenos del Rio Chilimpe was selected for extensive study. Production processes and family income structure was analyzed for 22 farmers for calendar year 1967. The most important sources of income for the majority of farmers were, in order: crop sales, livestock sales, and timber sales. 59% of family receipts for the average farmer were provided by crop sales. The most important crop was plantain. Important developmental benefits of land settlement in Santo Domingo de Los Colorados include: economic integration, redistribution of income, and creation of a modern agricultural sector.

**PB-224 225** PC A02/MF A01  
Auburn Univ., Ala. International Center for Aquaculture.

**Progress Report on Fisheries Development in Northeastern Brazil. I. Aquaculture**

N. B. Jeffrey. Aug 72, 11p AID-BR-639.20981-J46

Contract AID/csd-2270

Identifiers: AIDH.

The United States Agency for International Development has been providing assistance to the Government of Brazil in freshwater fisheries since 1966. The project goal established for this assistance is to create a freshwater fisheries group capable of planning and conducting practical research programs in the fields of food technology, fish culture, and fisheries biology. The purpose is to increase fish production in Northeast Brazil through proper management of the freshwater fisheries, improvement of fish processing methods, and the introduction of intensive fishculture techniques. Once these purposes are achieved, general well-being of the people can be improved by increasing the amount of protein available for human consumption and by creating opportunities for capital investment. This report summarizes and evaluates USAID assistance in fisheries biology, and provides a brief description of the Drought Polygon of Northeastern Brazil, the reservoir fisheries, the marketing systems and sections on past and present strategy, project status, and recommendations for future action.

**PB-224 227** PC A04/MF A01  
Agency for International Development, Washington, D.C.

**Oil Seed Production in the Tropics and Sub-Tropics**

Technical series paper no. 6.  
Feb 72, 70p Rept no. AID-633.85-A265  
Identifiers: AIDH.

The study is intended to survey the importance of annual (vegetable) oilseed crops in developing countries and to provide certain basic information as to the characteristics and utility of the more important types. The species considered included groundnuts, sesame, sunflower, safflower, cottonseed, soybeans, and castorbeans. This study deals with each of the seven annual oil seed crops, as to their respective plant characteristics; ecological adaptation; uses; cultural practices for higher levels of productivity; world production centers; and world trade in the oil seeds, their extracted oils, and the cake or meal derived from extraction of the oil.

**PB-224 266/7** PC A06/MF A01  
Environmental Protection Agency, Cincinnati, Ohio. Office of Water Program Operations.

**Selection and Operation of Small Wastewater Treatment Facilities - Training Manual**

Charles E. Sponagle. Apr 73, 117p\* Rept no. EPA-430/1-73-005

Descriptors: \*Sewage treatment, \*Manuals, Education, Packaged sewage treatment, Septic tanks, Industrial plants, Water pollution, Maintenance.  
Identifiers: \*Sewage treatment plants, Physical chemical treatment, EPAWP.

The training manual consists of a series of outlines used as a base of instruction. Subjects covered include characteristics of the water environment; pollution from municipal and industrial sources; methods of wastewater treatment; consideration of specific types of small treatment plants, including septic tanks, package plants, and lagoons; and control tests, sampling, and inspections associated with maintaining effective treatment plant operation.

**PB-224 292** PC A03/MF A01  
Cornell Univ., Ithaca, N.Y. Dept. of Agricultural Economics.

**Rural Works and Employment: Description and Preliminary Analysis of a Land Army Project in Mysore State, India**

W. Graeme Donovan. Apr 73, 28p AID-IN-331.763-D687

Contract AID/csd-2805

Identifiers: AIDH.

Under the Crash Scheme for Rural Employment, the most recent Central Government program of rural works in India, numerous projects have been set up throughout the country. This paper contains a description and analysis of one such project in Mysore State.

**PB-224 365** PC A02/MF A01  
Auburn Univ., Ala. International Center for Aquaculture.

**Relationship of the Thai Fish Culture Program to Production of Fish in the Lower Mekong Area**

H. S. Swingle. Feb 72, 17p AID-TH-639.3-S978

Contract AID/csd-2270

Presented at the Seadag Mekong Development Panel Seminar, held at Santa Barbara, Calif., on 3-5 Feb 72.

Identifiers: AIDH.

Research by the Thailand Department of Fisheries Stations and Research Units has developed cultures for use in hatcheries, rice fields, ponds, cages, pens and irrigation ditches that can be utilized in rapid expansion of fish production as irrigation water is made widely available from Mekong impoundments. They have also determined the feeding habits of many indigenous species to facilitate selection of species capable of utilizing the various types of natural fish-food organisms in various habitats.



# APPROPRIATE TECHNOLOGY ABSTRACTS

**PB-224 400/2** MF A01  
National Research Council, Washington, D.C. Committee on Animal Health.

**Control of Rabies**  
May 73, 33p  
International Standard Book No. 0-309-02124-3  
Prepared by National Academy of Sciences, Washington, D.C.  
Paper copy available from National Academy of Sciences, Printing and Publishing Office. 2101 Constitution Ave., Wash. D.C. \$2.00.

Descriptors: \*Rabies, Prophylaxis, \*Vaccines, Rabies, \*Wildlife, Rabies, Infectious diseases, Nervous system disorders, Viral diseases, Convulsive disorders, Pathology, Immunity, Public health, Veterinary medicine, Mammals, Animal diseases, Epidemiology, Arboviruses, Rabies virus.  
Identifiers: Rhabdovirus, Neurotropic viruses, NAS.

The report deals with the pathogenesis of rabies; virus-wildlife interactions; vaccines and regulatory aspects; and control programs for the four classes of hosts involved in rabies--domestic pets, wild animals, domestic livestock, and man. This valuable guide provides practical, current, and concise information on all aspects of rabies control. A compendium of animal rabies vaccines is presented at the conclusion of the report that includes information on live and inactive vaccines licensed in the United States. Specific information provided includes the name of each vaccine, companies licensed to sell these vaccines, suggested regimen recommended, and duration of immunity.

**PB-224 401/0** Not Available NTIS  
National Academy of Sciences, Washington, D.C.  
**Communication for Change with the Rural Disadvantaged. A Workshop**  
Feb 72, 121p  
International Standard Book No. 0-309-01942-7.  
Library of Congress Card No. 72-186371.  
Paper copy available from National Academy of Sciences, Printing and Publishing Office 2101 Constitution Ave., Washington, D.C. 20418 \$3.75.

Descriptors: \*Social change, \*Rural areas, \*Communicating, \*Reference groups, Socioeconomic status, Objectives, Problem solving, Methodology, Organizations, Sociopsychological surveys, Constraints, Social communication.  
Identifiers: Disadvantaged groups, Workshops, NAS.

At a time when many programs designed to meet the needs of the rural disadvantaged are falling short of the mark, the report examines obstacles to effective communication between the rural disadvantaged, those who are working with them, and the public at large. It presents scholarly aspects of analysis and research on one hand, and impact of the responses of the disadvantaged on the other.

**PB-224 411/9** PC A02/MF A01  
Puerto Rico Planning Board, Santurce.  
**Experimental Industrialized Housing Program. Model H-620 - Single Family Dwelling**  
Final rept. on phase 2.  
30 Sep 72, 19p Rept no. PRPB-71-02  
Prepared by Puerto Rico Urban Renewal and Housing Administration.

Descriptors: \*Residential buildings, Reinforced concrete, \*Prefabrication, Houses, \*Construction, \*Puerto Rico, Socioeconomic status, Cost analysis, Asbestos cement products, Roofs, Wooden structures, Floors, Walls, Project planning.  
Identifiers: \*Low cost housing, Detached dwellings, Low income housing, UPCD.

The report contains a description and plans for a reinforced concrete house with asbestos cement roof, to be prefabricated by industrialized methods. A detailed cost analysis is included.

**PB-224 427/5** MF A01  
National Academy of Sciences, Washington, D.C.  
**Alternative Sources of Protein for Animal Production**  
31 Jul 72, 184p\*  
Internal Standard Book No. 0-309-02114-6  
Proceedings of a Symposium. Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

Paper copy available from National Academy of Science Printing and Publishing, 2101 Constitution Ave., Washington, D.C. \$5.75.

Descriptors: \*Feeding stuffs, Proteins, \*Livestock, Feeding stuffs, Meetings, Grains(Food), Forage crops, Food processing, Meat, Blood, Oilseeds, Fish protein concentrates, Agricultural wastes, Industrial wastes, Quality, Utilization, Evaluation, Animal nutrition.  
Identifiers: Animal wastes, NAS.

For the benefit of livestock and poultry producers, feed manufacturers and scientists and researchers in animal husbandry, this report reviews potential sources of protein and considers ways to increase the quantity and improve the biological value of protein for animal production. Some of the symposium papers presented in the report explore measures for enhancing protein supplies from known proteinaceous feeds, while others identify and evaluate some new or underutilized sources. In discussions of known sources of protein, the report considers ways to improve the quantity and quality of protein in cereal grain, separate protein from fiber in forage crops, improve the processing and utilization of animal by-product proteins, increase production of oilseed protein, change utilization patterns. New sources of protein discussed include such less-utilized oilseeds as sunflower and sesame, the grain legumes, whole fish protein, single-cell protein from industrial wastes, and recycled animal wastes.

**PB-224 506** PC E03/MF A01  
Bureau of Sport Fisheries and Wildlife, Denver, Colo. Denver Wildlife Research Center.  
**Chemical Control of Vampire Bats**  
G. Clay Mitchell, and Richard J. Burns. May 73, 82p AID-599.4-M681  
Grant PASA-RA(ID)-1-67  
Prepared in cooperation with Instituto Nacional de Investigaciones Pecuarias, Secretaria de Agricultura y Ganaderia, Gobierno de Mexico.  
Identifiers: AIDH.

Two different chemical methods for reducing populations of vampire bat populations are described. Both methods are based on an anitcoagulant, diphenadione. The chemical is either injected into the rumen of cattle or applied directly to the back of vampire bats captured near livestock. The blood of treated cattle is poisonous to vampire bats for about three nights following treatment. Vampire bats with the anticoagulant applied to their backs return to their roost where the chemical is passed from one to several others by contact and mutual grooming. One treated vampire bat can carry sufficient chemical to poison 20 other vampire bats. (Available in English and Spanish)

**PB-224 749/2** PC A05/MF A01  
National Academy of Sciences, Washington, D.C.  
**Mosquito Control. Some Perspectives for Developing Countries**  
Mar 73, 76p\*  
Contract AID/csd-2584  
A report of an Ad Hoc Panel of the Advisory Committee on Technological Innovation, Office of the Foreign Secretary. Summaries in Spanish and French.

Descriptors: \*Culicidae, \*Pest control, \*Developing countries, \*Insect control, Nematoda, Fungi, Larvae, Parasitology, Plants(Botany), Growth regulators, Fishes, Protozoa, Insect vectors, Invertebrates.  
Identifiers: \*Mosquito control, \*Biological insect control, AID.

The panel of Perspectives in Mosquito-Control Methods Suitable for Developing Countries met in Washington, D.C. four times during 1972 and 1973. The panel identified almost fifty topics in biological, chemical, or environmental control of mosquitoes that are not receiving the research attention they warrant. The panel chose nine topics that were promising for use in developing countries. These topics are: larvivorous fish, invertebrate predators, genetic control, parasitic nematodes, parasitic protozoans, parasitic fungi, pathogenic bacteria, juvenile hormone mimics, and larvicidal plants. Each topic covered in the report includes a

list of selected readings, and source of research. Panel members are listed.

**PB-225 034/8** PC A05/MF A01  
Washington Environmental Research Center, D.C. Environmental Studies Div.  
**Quality of Life Indicators. A Review of State-of-the-Art and Guidelines Derived to Assist in Developing Environmental Indicators**  
Martin W. Brossman. Dec 72, 88p\* Rept no. 62062

Descriptors: \*Environments, Characteristics, Economic conditions, Social organization, Development, Analyzing, Classifications.  
Identifiers: Quality of life, Economic indicators, Social indicators, Environmental indicators, EPAORM.

The report provides a review and assessment of the state-of-the-art of quality of life indicators. Economic indicators, social indicators, environmental indicators, and an all encompassing quality of life indicator are discussed. The report traces the history of each category of indicator development, discusses the difficulties found and suggests guidelines for future indicator development.

**PB-225 129/6** PC A03/MF A01  
National Academy of Sciences, Washington, D.C.  
**Research Management and Technical Entrepreneurship: A U.S. Role in Improving Skills in Developing Countries**  
An Hoc Advisory Panel.  
1973, 50p  
Contract AID/csd-2584  
Library of Congress Catalog Card No. 73-12294.

Descriptors: \*Industrial engineering, \*Developing countries, \*Transfer of technology, \*Management planning, Research management, Research, Reviews, Quality control, Production control, Improvement, Economic forecasting, Management training, Industrial relations, Problem solving, Project planning, United States.  
Identifiers: Less developed countries, Research and development, AID.

The Ad Hoc Advisory Panel on Research Management and Technical Entrepreneurship in LDCs reviewed the gamut of technical functions involved in improving industrial operations in LDCs. It examined research management as a part of technical management--from quality and production control, through product and process improvement, to the development of indigenous technology or assimilation of advanced technology from abroad, and finally to project or process evaluation. The report argues for an experimental approach to try out and perfect avenues of training, in concert with other countries similarly engaged, and to the fullest extent possible within the developing countries themselves.

**PB-225 652** PC A02/MF A01  
Minnesota Univ., St. Paul. Dept. of Agricultural and Applied Economics.  
**The Economics of Olive and Oilseeds in the Mediterranean Region. (NEA-633.85-A478)**  
Staff paper  
Osama A. Al-Zand. Jan 73, 22p P73-5, AID-NEA-633.85-A478  
Contract AID/csd-2815  
Identifiers: AIDH.

After a brief review of the region's major economic indicators and the nature of the commodities under consideration, the paper is focused on the discussion of the economic characteristics of edible oils and oilseeds in comparison with olive oil, the demand for edible oils in the Mediterranean region, and the future outlook for oils and oilseeds in this region. The activities and policies of both importing and exporting countries of oils and oilseeds to foresee and accommodate future market developments should be rather decisive in shaping the size of trade and trade patterns in these products within the region.

**PB-225 700/4** PC E04/MF A01  
West Virginia Univ., Morgantown. Engineering Experiment Station.



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**Proceedings of the Annual Symposium on Reduction of Costs in Hand-Operated Glass Plants (3rd), May 17-19 1972 held at the West Virginia University, Clarksburg**  
Richard P. Smith. Nov 73, 99p\* Rept no. Bull-107  
Pub. as West Virginia Univ. Bull. Ser-74, no. 1-5.

**Descriptors:** \*Glass industry, \*Cost engineering, Symposia, Alkali glass, Glassware, Manufacturing, Metal coatings, Molding techniques, Personnel development.  
**Identifiers:** WVUEES.

**Contents:**  
Lithia boosting of soda-lime glasses;  
Plasmacoating - a new approach to metallic application in glass decorating;  
A new look at an old art -- mixing;  
Mold polishing revolution to the glass industry;  
Heat/energy recovery for the glass industry;  
Current information on education relative to hand operated glass plants in Scandinavia, Europe and some Communist countries;  
and The use of cast refractories in small glass works.

**PB-225 787** **PC A02/\$1.45**  
International Rice Research Inst., Los Banos, Leguna (Philippines). Agricultural Engineering Dept.  
**Drying and Processing Research at IRRI. (633.18-M266)**  
Seminar paper  
A. S. Manalo, J. R. Arboleda, and Amir U. Khan.  
12 Aug 72, 25p AID-633.18-M266  
Contract AID/csd-2541  
Identifiers: AIDH.

The development of a low-cost farm drying and processing equipment that would be suitable for use and manufacture in the developing countries is of urgent necessity. Such equipment could be used by the medium-size farm holdings of 2 to 10 hectares which contribute a large portion of the land under paddy cultivation in Southeast Asia. Very few attempts have been made by private manufacturers on the development of small drying and processing equipment. Research and development on low-cost drying and processing equipment for small-scale operation is one of the important areas of activities at the Agricultural Engineering department of the Institute.

**PB-225 789** **PC A03/MF A01**  
International Rice Research Inst., Los Banos, Leguna (Philippines). Agricultural Engineering Dept.  
**Economic Aspects of Hand Tractor Ownership and Operation. (RP-631.3-064)**  
Seminar paper  
Bert Orcino. Dec 72, 33p AID-RP-631.3-064  
Contract AID/csd-2541  
Seminar on Farm Mechanization in Southeast Asia, Penang and Alor Star, Malaysia, 27 Nov-2 Dec 72.  
Identifiers: AIDH.

The report discusses the economics of hand tractor ownership and operation. The objectives are to analyze input-output data on various types of hand tractors and to define the relationship between tractor use and costs via average cost curves. The first section contains a technical description of hand tractors used on Philippine rice farms. Information on why the tractors were bought and what criteria were used in choosing them are given in the second section. The third section is devoted to a comparative economic evaluation of power tillers and the fourth is an attempt to establish the conditions under which hand tractor repayments can be made. The last section examines the impact of devaluation on hand tractor use.

**PB-225 798** **PC A03/MF A01**  
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.  
**Improving Internal Marketing Systems as Part of National Development Programs. (380.141-R573)**  
Conference paper  
Harold M. Riley. May 72, 30p Staff Paper Ser-72-10, AID 380.141-R573

Contract AID/csd-2826  
Identifiers: AIDH.

The information base and the views expressed in this paper have been derived from a marketing research and development project (LAMP - Latin American Marketing Planning Center) through which a Michigan State University group has carried out studies in Puerto Rico, Northeast Brazil, Bolivia and Colombia in collaboration with local governments and their related agencies. The material being presented in this paper represents an accumulation of experience over a period of approximately seven years by the Michigan State University group. The primary purpose of this effort has been to conduct diagnostic studies of internal marketing systems linking large urban centers with their rural supply area and to formulate recommendations for marketing improvements. This activity has centered upon agricultural marketing broadly defined to include not only agricultural product marketing but also the distribution of farm inputs and consumer goods.

**PB-225 800** **PC A03/MF A01**  
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.  
**Designing Agricultural Marketing Systems in Developing Countries. (380.141-S825)**  
James D. Shaffer. Feb 72, 32p Staff Paper Ser-72-3, AID-380.141-S825  
Contract AID/csd-2826  
Presented at the Agricultural Marketing Conference held in Kathmandu (Nepal), on 21-24 Feb 72.  
Identifiers: AIDH.

The purpose of this paper is to discuss the design of improved agricultural marketing systems as a means of stimulating economic development. This implies two propositions: (1) that the marketing system can be an active element in the development process and (2) that high performance marketing systems do not develop automatically in response to the needs of a particular situation. Marketing is often neglected in development planning because one or the other or both of these propositions are implicitly rejected. The theme of this paper has been that improved organization and coordination of food production-distribution systems is critical in the effective transformation from a traditional agricultural economy with low productivity to a scientific industrial one with high productivity.

**PB-225 801** **PC A03/MF A01**  
North Carolina Agricultural Experiment Station, Raleigh.  
**Nitrogen Fertilization and Management in Tropical Rice. (633.18-S211)**  
Technical bulletin  
Pedro A. Sanchez. Nov 72, 33p TB-213, AID-633.18-S211  
Contract AID/csd-2806  
Identifiers: AIDH.

Rice is the main food crop in the tropics. It is the only important crop capable of growing in flooded soils because of its ability to oxidize its rhizosphere. Rice responds almost universally to nitrogen fertilization. Nitrogen reactions are markedly affected by oxidation-reduction status of the soil, which largely depends on water management and soil physical conditions. Temporary flooding in most tropical areas causes loss of native or applied nitrogen. The responses of rice to nitrogen are minimal when tall varieties are used. In contrast, the responses are large and economical when higher rates are applied to short-statured varieties. Nitrogen recommendations for flooded rice are based on soil properties, plant type, solar energy, temperature, water management, and spacing.

**PB-225 803** **PC A07/MF A01**  
International Rice Research Inst., Los Banos, Leguna (Philippines). Agricultural Engineering Dept.  
**Establishing Design Criteria for Improved Rice Milling Technologies. (RP-633.18-D855)**  
Seminar rept.  
Bart Duff, and Ida Estioko. Aug 72, 130p AID-RP-633.18-D855  
Contract AID/csd-2541  
Identifiers: AIDH.

The paper addresses itself specifically to the problems of modernizing and upgrading the rice milling industry. More precisely, it is an attempt to critically assess the efficiency and economics of existing rice milling technologies. The objectives are to determine the potential for technical improvements in existing systems and, where feasible, the efficacy of initiating activities to design and develop new technologies which will increase efficiency and reduce losses. The analysis is confined principally to milling equipment and does not include an evaluation of issues relating to storage or drying.

**PB-225 933** **PC A03/MF A01**  
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.  
**Three Rural Development Models for Small Farm Agricultural Areas in Low Income Nations--Some Results from Comilla, Bangladesh. (BG-301.34095492-S845)**  
Staff paper  
Robert D. Stevens. Jun 72, 29p AID-BG-301.34095492-S845  
Contract AID/csd-2826  
Identifiers: AIDH.

The paper provides an outline and analysis of three effective models of programs for small farm agricultural areas based upon ten years experience in Bangladesh. The models are for (1) effective agricultural cooperatives, (2) the improvement of rural government, and (3) for a social science institution which conducts pilot operations, training, and research in rural development. In a broader social science framework, development programs require analysis in the framework of cultural and economic change. The role of models such as the three analyzed here is to provide ways to accelerate change at a productive rate toward desired goals.

**PB-225 935/6** **PC A18/MF A01**  
Rivkin/Carson, Inc., Washington, D.C.  
**Economic Development and Water Resource Investment**  
Aug 73, 416p\*  
Contract DI-14-06-D-7336

**Descriptors:** \*Economic analysis, \*Regional planning, \*Water resources, Growth, Measurement, Investments, Factor analysis, Benefit cost analysis, Interactions, Regions, Requirements, Community relations, Concepts, Demography.  
**Identifiers:** BR.

Innovative approaches are explored for measuring and identifying benefits to area economic development through water resource improvements. A new approach was developed and tested, and some significant methodological conclusions were reached. General conclusions of the analysis relating water resource projects and other public expenditures to economic development are: (1) water-related investments affect both the level of economic activity and its growth; (2) water resource developments viewed as factors of production can be examined for their substitution relationships with non-water production factors; and (3) the effect of water on economic growth depends on (a) the state of the regional economy in which the investment is made, and (b) other non-water investments.

**PB-225 946** **PC A05/MF A01**  
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.  
**Rural Development Programs for Adaptation from Comilla, Bangladesh, (BG-301.34095492-S845a)**  
Robert D. Stevens. Jun 72, 80p AID-BG-301.34095492-S845a  
Contract AID/csd-2826  
Identifiers: AIDH.

Introductory material and background on the Academy for Rural Development in Comilla and the methods used in developing rural programs are presented first. The paper then briefly describes essential elements of six rural development programs organized at Comilla. Detailed analysis follows of two of these programs: Improvements in rural government, and development of new agricultural cooperatives. Conclusions, about the po-



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tential of these programs for adaptation in other nations are presented in the final section.

**PB-225 956** PC A03/MF A01  
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.  
**The Effectiveness and Financial Stability of the Comilla Agricultural Cooperative Credit System for Small Farmers, (BG-332.71-S845)**  
Robert D. Stevens, and Anwarul Hoque. Apr 71, 29p Staff Paper Ser-72-8, AID BG-332.71-S845  
Contract AID/csd-2826  
Presented at a Workshop on 'Agricultural Credit for Small Farmers in Less Developed Countries', held in Arlington, Va., on 6-7 Apr 71.  
Identifiers: AIDH.

After some introductory remarks providing a framework within which this analysis is made, the paper focuses in Part II on the effectiveness of the Comilla Cooperative System in providing credit to small farmers. The third part of the paper examines the operating procedures and economic stability of the Comilla Agricultural Cooperatives Federation. In the fourth part, some conclusions and discussion of special issues are offered.

**PB-226 015** PC E08/MF A01  
American Institutes for Research, Pittsburgh, Pa.  
**Ability Testing in Developing Countries. A Handbook of Principles and Techniques. (371.264-S411a)**  
Handbook 1960-1968  
Paul A. Schwarz, and Robert E. Krug. 1972, 257p AID-371.264-S411a  
Contract AID/csd-798  
Identifiers: AIDH.

An eight-year program of research and development with the objective of devising techniques of aptitude testing that could be applied in cultures in which standard ability tests are not fully effective and to assist in the application of these techniques to human resource development program was conducted under an AID-supported program. The final phase of the project developed and presented the results in the form of this handbook.

**PB-226 478/6** PC A06/MF A01  
Colorado Univ., Boulder. Dept. of Civil and Environmental Engineering.  
**Individual Home Aerobic Wastewater Treatment Systems**  
Master's thesis  
Robert Norman McBride. 1972, 121p\* OWRR-A-021-COLO(2)

Descriptors: \*Houses, \*Sewage treatment, \*Aerobic processes, Statistical data, Design, Biochemical oxygen demand, Septic tanks, Evaluation, Tests, Theses, Residential buildings.  
Identifiers: OWRR.

A system that has an economic advantage over septic tanks under certain soil conditions is the aerobic system. The use of aerobic systems is described including unit functions, types of units available, and problems and recommendations for improvement. Aerobic units under experimental conditions were observed to produce a better effluent than a septic tank. However, the performance as claimed by the manufacturers, could be misleading to homeowners. The results of tests run on the units located in the field show that the units are meeting the manufacturers standards about 20% of the time. These units only average about a 44% reduction in BOD. This is assuming an incoming BOD of 250 mg/liter. In some cases the tests showed an influent BOD greater than this.

**PB-226 621/1** PC E06/MF A01  
Cornell Univ., Ithaca, N.Y. Program on Policies for Science and Technology in Developing Nations.  
**The Natural Resource Potential for Regional Development of Limon Province: A Preliminary Survey**  
Oct 73, 162p  
Contract AID/csd-3391

Descriptors: \*Natural resources, \*Costa Rica, \*Economic development, Economic surveys, Re-

gional planning, Industrial relations, Agriculture, Transportation, Livestock, Wildlife, Developing countries.  
Identifiers: \*Limon Province(Costa Rica), Tourism, AID.

The study is part of a larger study to understand the appropriate role of science and technology in the development of a small country like Costa Rica. The Limon survey may be described as a broad brush survey of the natural resources existing in the region. This effort comprised gathering data relevant to the survey, evaluating the data, and suggesting studies for formulating policies for regional development. The study was made by a team from Cornell University in cooperation with Costa Rican consultants.

**PB-227 053/6** PC A02/MF A01  
Environmental Protection Agency, Washington, D.C. Office of Pesticide Programs.  
**Diagnosis and Treatment of Poisoning by Pesticides**  
1974, 16p  
Report on Project Safeguard: Safe Pesticide Practices.

Descriptors: \*Toxic diseases, \*Pesticides, Diagnosis, Therapy, Drug therapy, Antidotes.  
Identifiers: EPAO.

With the DDT ban, effective January 1, 1973, the use of a variety of other chemicals must be increased to substitute for DDT in the control of insects. Replacement chemicals will probably include among others: organophosphates; carbamates; chlorinated hydrocarbons; and botanicals. Chemicals replacing DDT will be less persistent in the environment than DDT. Some replacement chemicals will be more acutely toxic to man and, therefore, will present greater potential hazards. An intensive short-term educational program, Project Safeguard, is underway to train the farmer in the safe use of these replacement chemicals, and this program should minimize the hazards from improper use. The potential still exists, however, for an increased incidence of toxic exposure and resulting clinical illness, in which accurate diagnosis and prompt treatment could mean the difference between life and death.

**PB-227 472/8** PC E05/MF A01  
Auburn Univ., Ala. Water Resources Research Inst.  
**Social Accounting Approaches to Water Resource Use in Economic Development**  
Research rept.  
Donald R. Street. Aug 72, 114p OWRR-B-029-ALA(3)  
Prepared in cooperation with Auburn Univ., Ala. School of Business Research Series 3.

Descriptors: \*Water resources, \*Economic development, Economic analysis, Economic models, Water pollution, Fisheries, Regional planning, Hydroelectric power generation, Alabama, Mercury(Metal), Plant location.  
Identifiers: Thermal pollution, Input output analysis, OWRR.

This collection of articles emphasizes the value of determining the costs associated with water-borne externalities. Pecuniary, technical, marginal and inframarginal externalities are defined and their effects on societies' production possibilities are examined. A survey was made to determine the loss of commercial fishing income arising from a fishing ban on an Alabama lake caused by mercury pollution. Total income loss to fishermen was mitigated by shifting their resources to other uses; as a result, it appears that only 15 commercial fishermen suffered income losses. The effect of production, consumption and disposal decisions on level and form of residuals was also examined. The modeling effort illustrates the flow of residuals and costs arising from power generation from either coal or nuclear fuel. The effect of water quality on regional growth was examined using an input-output model. A decrease in usable water was traced to show its composite effect on income, consumption, and governmental expenditures and revenues.

**PB-227 591/5** PC A04/MF A01  
Bureau of Labor Statistics, Washington, D.C.  
**Woodworking, Circular-Saw Accidents**  
Final rept. 1951-52.  
Jan 56, 74p Rept no. BLS-Bull-1190  
Also available in set of 56 reports as PB-243 125-SET, PC E99, MF E99.

Descriptors: \*Sawmills, \*Industrial accidents, Personnel, Sawing, Woodworking, Injuries, Safety engineering, Industrial hygiene, Statistical data, Statistical analysis.  
Identifiers: \*Occupational safety and health.

The report contains the results of a study of over 1,200 accidents which involved circular saws. Portable circular saws and large circular saws used in sawmills were excluded. State safety inspectors investigated any accident within the scope of the study which they found in the course of performance of their regular duties. Only accidents which occurred during 1951 or 1952 were included. Information about the number of injuries by nature of injury, part of body injured, agency (source) of injury, type of accident, hazardous condition, unsafe act, and activity of injured (feeding, off bearing, etc.) is presented. Descriptions of 22 typical accidents with recommendations for preventing them are included.

**PB-227 616/0** PC A11/MF A01  
Southern Illinois Univ., Carbondale. Dept. of Design.  
**Simplified Housing Construction Systems for Rural Poor Families**  
Final rept.  
J. Michael DeRienzo. Jan 73, 241p\* Rept no. JMDCONS-73-1

Descriptors: \*Residential buildings, \*Construction, \*Manuals, \*Economic factors, \*Rural areas, Socioeconomic status, Construction materials, Systems engineering, Structural design, Components, Methodology, Construction costs, Illinois.  
Identifiers: Low cost housing, OUTF.

The volume is designed to familiarize the groups of underprivileged rural inhabitants with simple construction techniques, new materials available, and the exploitation of common but often unrecognized building materials. Use of the latest technology, along with low cost or no cost materials and methods will permit an owner-builder to assemble a rationalized living unit. Emphasis is on construction techniques which require little skill and time to accomplish.

**PB-228 100/4** PC A09/MF A01  
Arizona Univ., Tucson. Office of Arid Lands Studies.  
**World Desertification: Cause and Effect. A Literature Review and Annotated Bibliography**  
Wade C. Sherbrooke, and Patricia Paylore. 1973, 176p\* Arid Lands Resource-IP-3, OWRR-W-141(3729)(3)  
Contract DI-14-31-0001-3729

Descriptors: \*Deserts, \*Land use, \*Bibliographies, Arid land, Climatology, Droughts, Precipitation(Meteorology), Land reclamation, Soil erosion, Reforestation, Agriculture, Grazing land, Reviews.  
Identifiers: OWRR.

An annotated bibliography is presented of 252 references, computer-produced from the University of Arizona's Arid Lands Information System (ALIS), with accompanying text that reviews briefly both cause and effect of world desertification. Causes fall into two categories: long-term (in the geologic sense) climatic change as supported by meteorological, archaeological, geomorphological, vegetational, palynological, and dendrochronological evidence in the literature; and those activities of man's historic occupancy of arid and semiarid regions that have contributed to degeneration of marginal lands: agricultural and irrigation practices, grazing, fire, nomadism, and sand stabilization and reforestation. Beyond these two categories, there is a third: climatic fluctuation - - short-term weather patterns induced by uncertain rainfall and followed by cyclic droughts from which marginal areas may not recover is subjected to continued attempts at intensive use that cannot be sustained by a dry



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year or a succession of dry years. Portions of this document are not fully legible.

**PB-228 148/3** PC A15/MF A01  
Environmental Protection Agency, Cincinnati, Ohio. Office of Water Program Operations. **Biological Treatment Technology (162)** Final rept. F. J. Ludazack. Dec 73, 326p\* Rept no. EPA-430/1-73-017

Descriptors: \*Sewage treatment, \*Manuals, Activated sludge process, Nutrients, Biochemical oxygen demand, Trickling filtration, Chlorination, Sludge disposal.  
Identifiers: EPAO.

This manual includes a collection of instructional materials to assist the student to upgrade performance of biological treatment facilities. Information gathering techniques related to wastewater characteristics, concentrations, and loading are described. The influence of these data upon common treatment operations and correction of treatability difficulties are considered. Operational control to maximize the performance of existing facilities are discussed along with selection of add-on operations or design of new facilities to upgrade the treatment system to a performance compliance status.

**PB-228 348/9** PC A07/MF A01  
National Academy of Sciences, Washington, D.C. Board on Science and Technology for International Development. **Meeting the Challenge of Industrialization: A Feasibility Study for an International Industrialization Institute** Aug 73, 145p\* Contract AID/csd-2584  
Report of a Special International Panel of the Board on Science and Technology for International Development Office of the Foreign Secretary. Library of Congress Catalog Card no. 73-11740. Summary in Spanish and French.

Descriptors: \*Economic development, \*Industrial relations, \*International relations, \*Organizations, \*Industrialization, Feasibility, Policies, Transfer of technology, Research, Project planning, Objectives, Developing countries.  
Identifiers: \*Institutes, AID.

The report advances the concept of an independent, interdisciplinary research institute to illuminate new policy options confronting all nations. The study was made by an ad hoc advisory panel of the National Academy of Sciences, in consultation with leaders concerned with economic development from developed and developing countries. Appendices: (A) Illustrative research projects, (B) Terms of reference, (C) List of conferees.

**PB-228 660/7** PC E03/MF A01  
National Science Research Council of Guyana, Georgetown. **Some Prospects for Aquatic Weed Management in Guyana** 17 Mar 73, 53p Contract AID/csd-2584  
Proceedings of Workshop on Aquatic Weed Management and Utilization Held in Georgetown (Guyana) 15-17 Mar 73. Prepared in cooperation with National Academy of Sciences, Washington, D.C.

Descriptors: \*Aquatic weeds, \*Guyana, Management, Utilization, Meetings, Aquatic biology, Weed control, Vegetation, Herbicides, Chemical properties, Feeding stuffs, Additives, Soils, Bibliographies.  
Identifiers: NAS.

The report is aof a three-day workshop on the management and utilization of aquatic plants, to formulate recommendations for implementation by local authorities to (1) deal with the aquatic weed problem, particularly by utilizing the vegetation as a resource for products, such as animal feeds and soil additives and (2) develop outlines of integrated systems of aquatic weed management in Guyana using biological, physical, and chemical methods. A bibliography is included.

**PB-229 181/3** PC E07/MF E07  
New Mexico Univ., Albuquerque. Technology Application Center. **Waste Glass Utilization. Cumulative Volume** 30 Jun 73, 222p\* Rept no. TAC/WGS-74-301 Available to non-U.S. addresses PC\$15.00, MF\$15.00.

Descriptors: \*Glass, \*Solid waste disposal, \*Recclamation, Aggregates, Paving, Foam, Grinding(Comminution), Crushing, Economics, Cement additives, Regulations, Abstracts, Symposium, Construction materials.  
Identifiers: \*Waste recycling, Glass recycling, \$TAC.

Glass, as a by-product of the total recycling process, may soon be available in quantities sufficient not only for the manufacture of more glass, but for use in a wide variety of secondary products. These products may range from resurfacing materials which can be used under a greater variety of environmental conditions than asphalt, to glass wool and construction panels. To explore these new products, a 'Symposium on the Utilization of Waste Glass in Secondary Products' was held in Albuquerque, January 24-25, 1973. This document is an updated version of a state-of-the-art survey on the use of glass in secondary products, first prepared for the Symposium.

**PB-229 209/2** PC E06/MF A01  
Housing Assistance Council, Inc., Washington, D.C. **An Analysis of Alternative Low-Income Rural Housing Systems** Final rept. Gordon Cavanaugh. 29 Jun 73, 137p HUD-PDR-406

Descriptors: \*Low income housing, \*Rural areas, Public housing projects, Surveys, Problem solving, Recommendations, Economic development districts, Housing agencies, Cost analysis, Defects, Systems analysis, Georgia, Colorado, South Carolina, Mississippi, Tennessee, Vermont.  
Identifiers: Alternatives, \*Housing and urban development research, OUTH.

The study examines several areas' housing authorities with regard to their public housing alternatives, and outlines the problems of small housing authorities. The report includes a design of a model agency and makes administrative and legislative recommendations.

**PB-229 813/1** PC E03/MF A01  
Agency for International Development, Washington, D.C. Office of Science and Technology. **Technological Opportunities for Tropical Forestry Development** Gordon D. Fox. Nov 73, 37p TA/OST-73-21, AID-ARC-634.0-F791

Descriptors: \*Tropical woods, \*Technology transfer, \*Forest industry, \*Developing countries, Economic development, Forestry management, United States, Project planning, Utilization characteristics, Socioeconomic conditions, Political objectives, Institutional implications, Improvement, Criteria.  
Identifiers: AID.

The paper is intended to identify the highest payoff opportunities for the application of U.S. technology to the needs of developing countries for sound management and utilization of forest resources. Specifically the paper includes: (1) development of criteria for determining whether the political-socio-economic and institutional framework in an LDC is sufficiently favorable so that technological inputs will meaningfully improve forest utilization and management; (2) identification of appropriate countries; and (3) examination of a limited number of countries to illustrate how specific technological inputs can be matched with priority needs, and assessment of likely pay-offs.

**PB-229 822/2** PC E02/MF A01  
Agency for International Development, Washington, D.C. Office of Science and Technology.

**Utilization of Tropical Forests. (A Review of the Forestry Literature in the Agency for International Development Reference Center)** Edward P. Cliff. Nov 73, 31p TA/OST-73-20, AID-ARC-634.98072-C637

Descriptors: \*Forestry, \*Developing countries, \*Reviews, Forest industry, Utilization characteristics, Land use, Trees, Problem solving, Recommendations, Reforestation, Project planning, Improvement, Economic development, Tropical woods, Africa, Latin America, Asia.  
Identifiers: AID.

A review is made of forestry reports, publications, and other documents in the A.I.D. Reference Center to determine information available on utilization problems of secondary tree species in the developing countries. The time span covered is 27 years beginning in 1946. The report identifies forestry and land use problems, and examines recommended measures to upgrade forestry programs and improve utilization of unused and little used species.

**PB-230 543/1** PC E04/MF A01  
National Academy of Sciences, Washington, D.C. **International Development Programs of the Office of the Foreign Secretary** Harrison Brown, and Theresa Tellez. Oct 73, 75p Contract AID/csd-2584

Descriptors: \*Scientific research, \*Program implementation, \*International relations, \*Developing countries, Technology development, Technology transfer, Institutional framework, Reviews, Performance evaluation, Organizations, Project planning, Attitudes, Specialized training, Recommendations.  
Identifiers: International development programs, AID.

The report is a history of events and analysis of results of joint programs between the National Academy of Sciences and counterpart groups in developing countries during 1959-1971.

**PB-230 738/7** PC E02/MF A01  
Forest Service, Washington, D.C. **Factors Influencing the Utilization of Tropical Wood Species** Final rept. Alan D. Freas, Martin Chudnoff, Robert C. Koeppen, and S. Blair Hutchison. Nov 73, 34p AID-ARC-634.9-F849 Grant PASA-TA(AJ)-2-73

Descriptors: \*Tropical woods, Utilization, Constraints, Reviews, Factor analysis, Economic development, Developing countries.  
Identifiers: AID.

A.I.D. has been concerned, for an extended period of time, over the deleterious practice, in many tropical countries, of concentrating on a relatively limited number of species of tropical woods for exploitation. This investigative report, through review of available literature and on-the-ground consultation in selected countries, attempts to determine whether lack of knowledge of secondary species characteristics is the primary deterrent to their increased use, or whether there are other equally and perhaps more important factors to be considered.

**PB-231 006/8** PC A05/MF A01  
Forest Products Lab., Madison, Wis. **Development of the Tropical Wood Resource** Martin Chudnoff. Nov 73, 76p\* TA/OST-73-23 Grant PASA-TA(AJ)-2-73

Descriptors: \*Tropical woods, \*Forestry management, Reviews, Forest industry, Forest trees, Inventories, Utilization, Identifying, Statistical data.  
Identifiers: Silviculture, AID.

The report is one of a series on the subject of tropical forest utilization and management. The report covers the period 1950-1970 and focuses on a few selected countries with emphasis on definition of forests. It is based mostly on a library study and is divided into seven parts: Literature review; forest flora; commercial species; forest enumerations;



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silvicultural systems; characterization of primary species; and ten-year summary of roundwood removals, production, and trade.

**PB-231 144/7** PC A04/MF A01  
Mitre Corp., McLean, Va.  
**Dissemination and Utilization of Solar Energy Research Results. Report to the Office of Systems Integration and Analysis Directorate of Applied Research, National Science Foundation**  
Final rept.  
Richard S. Greeley. Dec 73, 69p MTR-6544, NSD-RA/N-73-111D  
Contract NSF-C831  
See also PB-231 145.

Descriptors: \*Solar energy, \*Research projects, \*Project management, Distributing, Utilization.  
Identifiers: Technology transfer, NSFRA.

Thirty recommendations have been made for establishing groups within or reporting to the NSF Solar Energy Program Office and initiating activities for the dissemination and utilization of solar energy research results. The primary recommendations include establishing an Advisory Commission and an information office reporting to the Program Director and constructing visitor centers on the sites of each Proof of Concept Experiment. Training courses and public education would be conducted at each center following successful operation of the POCE system. (Modified author abstract)

**PB-231 149/6** PC A07/MF A01  
Massachusetts Univ., Amherst.  
**Proceedings of the Bioconversion Energy Research Conference Held at Massachusetts Univ., Amherst on 25-26 June 1973**  
26 Jun 73, 129p\* NSF-RA/N-73-007  
Grant NSF-GI-39215

Descriptors: \*Solid waste disposal, \*Materials recovery, \*Methane, \*Meetings, Digestion(Decomposition), Anaerobic processes, Refuse disposal, Garbage disposal, Sewage disposal, Manufactured gas.  
Identifiers: \*Methane digestion, NSFRA.

The two-day conference addressed itself to the question of biological conversion of waste and feedlot materials to methane. The specific objectives of the conference were: to exchange recent research information between engineers and scientists on research accomplishments and problems related to bioconversion studies; to contribute to the long-range planning of the funding agencies and research workers in the field; to provide improved communications between the research community and the users' groups; to identify the processes and technology important to the production of methane from waste and feed lot materials; to identify the important economic factors associated with bioconversion processes. These proceedings consist of the summary statements provided by each principal speaker at the conference, together with a transcript of essentially all of the tape-recorded question-and-answer period that followed each presentation.

**PB-231 207/2** PC A04/MF A01  
Florida Univ., Gainesville. Water Resources Research Center.  
**Processing, Chemical Composition and Nutrient Value of Aquatic Weeds**  
L. O. Bagnall, R. L. Shirley, and J. F. Hentges. 16 Nov 73, 59p WRRR-Pub-25, W74-06502  
Contract DI-14-31-0001-3209, DI-14-31-0001-3509

Descriptors: \*Aquatic weeds, \*Feeding stuffs, \*Water pollution control, Animal physiology, Acceptability, Chemical composition, Digestion(Biology), Composts, Cost estimates, Dewatering, Animal nutrition.  
Identifiers: Eichhornia crassipes, Hydrilla verticillata, Silage, OWRR.

As an alternative to chemical control, water hyacinth (Eichhornia crassipes) and hydrilla (Hydrilla verticillata) can be converted to agriculturally useful products. Whole or chopped plants can be readily

composted to create an organic material for potting plants. The 90 to 95% moisture content plants can be pressed to remove 75% of the water with a modest energy input. The pressed plants can be ensiled with suitable additives or dried to make animal feed. Animal acceptability of properly made hyacinth silage was very good. Animal utilization of protein was poor and that of other nutrients was fair for both dried and ensiled water hyacinth.

**PB-231 269/2** PC E03/MF A01  
Oregon Univ., Eugene. Bureau of Governmental Research and Service.  
**Rural Transfer and Modified Landfill. A Comparison of Cost Indicators for Low Volume Rural Solid Waste Disposal Methods**  
Dec 73, 45p

Descriptors: \*Solid waste disposal, \*Rural areas, \*Management planning, Costs, Transportation, Oregon.  
Identifiers: Sanitary landfills, Lane County(Oregon), Waste transfer stations, EPASW.

One of the key considerations in selecting a system of solid waste management is the relative costs of the available alternative systems. This report was prepared in order to provide public officials and solid waste management planners with information upon which they can base estimated costs of operating a rural transfer system as well as a modified landfill system. The suggested estimating techniques are compatible and permit comparison of the estimated costs of these two alternative management systems. The experience of the Lane County, Oregon Solid Waste Division provided the basis for development of the cost estimating techniques outlined in this report.

**PB-231 341/9** PC A12/MF A01  
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.  
**Wind Energy Conversion Systems. Workshop Proceedings Held at Washington, D.C. on 11-13 June 1973**  
Joseph M. Savino. Dec 73, 267p\* N74-16757  
Grant NSF-AG-465

Descriptors: \*Wind power generation, \*Meetings, Windmills, Wind, Electric power plants, Sites, Site surveys, Planning, Electric generators, Rotors, Electric converters, Energy storage, Towers.  
Identifiers: Energy conversion, NSFRA.

Contents:  
Important past developments;  
Wind characteristics and siting problems;  
Rotor characteristics;  
Energy conversion systems;  
Energy storage;  
Small wind power systems for remote and individual applications;  
Wind power systems for large-scale applications;  
Tower structures;  
Committee reports.

**PB-231 391/4** PC E04/MF A01  
Transport and Road Research Lab., Crowthorne (England).  
**The Compaction of Soils and Stabilized Bases on Road in East Africa**  
M. P. O'Reilly. 1974, 75p Rept no. TRRL-LR-600

Descriptors: \*Pavement bases, \*Soil compacting, Roads, Soil stabilization, Soil water, Tropical regions, Construction, Test methods, Sands, Clay soils, Gravel, Porosity, Africa, Great Britain, Sub-Saharan Africa.  
Identifiers: GBRR.

As part of a study of aspects of normal road-building practice in tropical countries, the states of compaction achieved in road bases and earthworks were investigated at ten road construction schemes in East Africa. In addition, where possible, controlled compaction trials were carried out. The most significant conclusion from the investigation is that the states of compaction achieved in the field correspond quite closely with those obtained in full-scale compaction tests carried out at the Transport and Road Research Laboratory. The study showed that the states of compaction com-

monly specified for tropical roads can be attained under normal working condition. (Modified author abstract)

**PB-231 485/4** PC E03/MF A01  
Texas Water Development Board, Austin. Systems Engineering Div.  
**Techniques for Identifying and Evaluating Market and Non-Market Benefits and Costs of Water Resource Systems**  
Completion rept.  
Milton L. Holloway. Jun 73, 24\* OWRR-C-3352(3738)(1)  
Contract DI-14-31-0001-3738

Descriptors: \*Water resources, \*Systems analysis, \*Water economy, Water management, Benefit cost analysis, Allocations, Socioeconomic conditions, Economic development, Policies, Mathematical models, Demand(Economics), Simulation, Regional planning, Environments, Whitney Lake, Lewisville Lake, Belton Lake, Texas.  
Identifiers: Aquatic environments, Water demand, OWRR.

The research project was designed to provide a set of analytical tools for water resource planners and decision-makers to assist them in measuring and evaluating the market and non-market benefits and costs of water resource systems. The techniques are designed to be sufficiently flexible to analyze all types of water development and management policies. The report describes: (1) the techniques developed to measure the economic, environmental, and social impacts of water policy alternatives, and (2) the application of these techniques to a test case of three existing reservoirs to determine the method's efficacy. The analyses are conducted in three major areas: economic, environmental, and social. (Modified author abstract)

**PB-231 894/7** PC A05/MF A01  
Forest Products Lab., Madison, Wis.  
**Physical, Mechanical, and Other Properties of Selected Secondary Species in Surinam, Peru, Columbia, Nigeria, Gabon, Philippines, and Malaysia**  
Martin Chudnoff. Nov 73, 83p\* TA/OST-73-24  
Contract PASA-TA(AJ)-2-73

Descriptors: \*Wood, \*Tropical regions, Hardwoods, Drying, Mechanical properties, Bending, Modulus of elasticity, Flexural strength, Durability, Density(Mass/volume), Surinam, Seru, Colombia, Nigeria, Gabon, Philippines, Malaysia.  
Identifiers: AID.

The report presents previously published information on the tree and wood characteristics of selected secondary species growing in seven tropical countries.

**PB-232 259/2** PC A13/MF A01  
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.  
**Phreatophytes. A Bibliography, Revised**  
Patricia Paylore. Apr 74, 282p\* WRSIC-74-201, W74-07829

Descriptors: \*Plants(Botany), \*Bibliographies, Arid land, Range grasses, Soil water, Evapotranspiration, Vegetation, Water table, Land reclamation, Shrubs, Soil erosion, Water loss, Irrigation.  
Identifiers: \*Phreatophytes, Water demand, \*Water yield improvements.

The report, containing 183 abstracts, is another in a series of planned bibliographies in water resources to be produced from the information base comprising Selected Water Resources Abstracts (SWRA). At the time of search for this bibliography, the data base had 68,063 abstracts covering SWRA through February 1974 (Volume 7, Number 4). Author and subject indexes are included.

**PB-232 292/3** PC E07/MF A01  
Housing Assistance Council, Inc., Washington, D.C.  
**An Analysis of Alternative Methods of Rural Home Repair**  
Final rept.



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Gordon Cavanaugh. 29 Jun 73, 175p HUD-PDR-431

Descriptors: \*Rural occupied housing units, \*Residential alterations and repairs, Methodology, Demography, Feasibility, Financing, Rehabilitation, Federal programs, Legislation, Income level, Subsidies, Models, Recommendations.  
Identifiers: \*Alternatives.

An analysis is made of home repair alternatives which are understandable only within a context of the housing conditions and the prevailing resources in rural America. Various recommendations were made with respect to new institutions, changes, and reforms for the report.

**PB-232 307/9** PC E03/MF A01  
NAHB Research Foundation, Inc., Rockville, Md.  
**Small Sewage Treatment Systems. Experience and Cost Data in 61 Subdivisions in 12 States**  
1959, 48p

Descriptors: \*Sewage treatment.

Contents: Policy; Costs; legislation; aesthetic considerations; what is sewage treatment; degree of treatment needed; stage construction for flexibility; operation and maintenance; successful sewerage installations; and incorporating sewage collection and treatment in the subdivision plan.

**PB-232 525/6** PC E04/MF A01  
National Academy of Sciences, Washington, D.C.  
**Nutritional Properties of Rice**  
D. F. Houston, and G. O. Kohler. 1970, 69p

Descriptors: \*Rice, \*Human nutrition, Food composition, Carbohydrates, Food processing, Nutritive value, Diets, Proteins, Amino acids, Vitamins, Food preparation, Classifications, Tables(Data), Bibliographies.

Contents:  
Background and present situation;  
Composition of rice and its milling products;  
Relative nutritional adequacy and nutrient availability of rice and its milling products;  
Enrichment and supplementation;  
Types of processed products and effects of processing on nutritional values;  
Effect of cooking processes on nutritional values;  
Special dietary values and problems;  
Areas for further research;  
Bibliography.

**PB-233 692/3** PC E05/MF A01  
International Biological Program. U.S. National Committee.  
**Insect-Plant Interactions. Report of a Work Conference**  
1969, 100p  
Contract NSF-C310

Descriptors: \*Meetings, \*Plants(Botany), \*Insects, Neurology, Behavior, Hormones, Responses, Physiology, Chemical reactions.

The report contains summaries of reports by some 36 participants on a wide variety of aspects of relationships between plants and insects including juvenile hormones and analogues, ecdysones, plant chemicals affecting insect behavior, and neurophysiological studies of responses to plant chemicals.

**PB-233 956/2** PC A08/MF A01  
Stanford Research Inst., Menlo Park, Calif.  
**Effective Utilization of Solar Energy to Produce Clean Fuel**  
Final rept.  
John A. Alich, Jr, and Robert E. Inman. Jun 74, 164p  
\* NSF-RANN/SE/GI-38723/FR-74-2  
Grant NSF-GI-38723

Descriptors: \*Fuels, \*Electric power generation, \*Vegetation, \*Biomass, \*Plant growth, Mass production, Production capacity, Farm crops, Farm management, Agricultural economics, Aquatic plants, Algae, Solar radiation.

The suitability of plant material as an energy feedstock was evaluated. Items covered include: types of vegetation best suited for a solar conversion facility, type and availability of land, logistics and economics of growing the desired crop, energy budget for plant material production and harvesting, and a technoeconomic comparison of firing the crops directly for electric power generation with converting them to clean fuel gas (methane or low-Btu gas) either at the farm site or at selected markets. Research needs in key technical and economic areas are pointed out.

**PB-234 444/8** PC A05/MF A01  
RAI Research Corp., Hauppauge, N.Y.  
**Improvement of Treatment of Food Industry Waste**  
Environmental protection technology series  
Sidney B. Tuwiner. May 74, 76p EPA-660/2-74-035  
Paper copy available from GPO PC\$1.25.

Descriptors: \*Dairies, \*Industrial waste treatment, \*Food processing, \*Activated carbon treatment, Byproducts, Flotation, Oxidation, Carbohydrates, Material recovery, Proteins, Electrolysis.  
Identifiers: \*Whey, \*Water pollution control, Chemical oxygen demand, Froth flotation, Cheese whey.

Laboratory studies were conducted to determine the feasibility of reducing the COD demand of cheese whey waste generated from dairy processing plants. Three primary processing variables were studied: Agitation, temperature, and current density. Results indicate electrolytic oxidation efficiency was best at 70C, agitation at 9.6 feet per second and a current density of 9.5 amperes per square foot (equivalent to 6 amperes in the test cell investigated). Concentration of 60 percent of the whey protein was also possible by collection of the froth produced during electrolysis. This mechanism of COD reduction could afford recoverable protein from the whey. Carbon adsorption of the electrolyzed whey was also shown to be extremely effective in reducing the COD. The carbohydrates after oxidation to carboxylic acids are very readily adsorbed, the carbon loading being in excess of that expected for secondary effluents. The feasibility of combining the electrolytic oxidation with froth collection and carbon adsorption is proposed as a possible attractive procedure for recovery of values from the whey.

**PB-234 503/1** PC E04/MF A01  
National Research Council, Washington, D.C.  
Building Research Advisory Board.  
**Roofing in Developing Countries. Research for New Technologies**  
1974, 85p  
Contract AID/csd-2584  
Library of Congress Catalog Card no. 73-10037

Descriptors: \*Roofing, \*Developing countries, Roofs, Housing shortages, Binders(Materials), Plastics, Cellular plastic, Sulfur, Plant fibers, Wood wastes, Reinforced concrete, Clays, Fibers, Thermoplastic resins, Reinforcing materials, Composite materials, Cements, Asphalts, Iron, Agricultural wastes, Cost analysis.  
Identifiers: Ferrocement.

More than 80 developing countries suffer from an acute housing shortage, principally because of the ever-increasing need for new housing created by expanding populations and the periodic large-scale loss of housing from natural disasters. The report presents the committee's conclusions and recommendations concerning areas of research and kinds of materials indicating significant potential for the development of new roofing technologies that could provide early solution to the particular problems of developing countries. Ten appendices address various technical aspects of potential new roofing technologies.

**PB-235 270/6** PC E13/MF A01  
National Academy of Sciences, Washington, D.C.  
**Regional Workshop on Water Resources, Environment and National Development held at Singapore on 13-17 March 1972. Volume II: Selected Papers**  
Mar 72, 447p

Contract AID/csd-2584  
See also PB-217 117.

Descriptors: \*Water resources, \*Environmental impacts, \*Southeast Asia, \*Meetings, Environmental health, Regional planning, Groundwater, Sewage treatment, Flood control, Water supply, Toxicity, Industrial waste treatment, Water management, Rice plants, Irrigation, Waste water reuse, Water pollution control.

Volume II contains selected papers presented at the Workshop on Water Resources, Environment, and National Development. The main purpose of the Workshop was to focus attention on current problems of water resources and the environment faced by countries of the Southeast Asian region, and stimulate regional cooperation in seeking solutions.

**PB-235 410/8** PC A05/MF A01  
National Academy of Sciences-National Research Council, Washington, D.C.  
**Food Science in Developing Countries: A Selection of Unsolved Problems**  
1974, 92p  
Contract AID/csd-2584  
Library of Congress Catalog Card No. 74-1602.

Descriptors: \*Human nutrition, \*Food, \*Developing countries, New technology, Resources, Preserving, Processing, Storage, Food composition, Food deterioration, Problem solving.

The report presents a collection of selected problems in the fields of food science and nutrition which are of immediate concern to developing countries. Each problem is organized under the following headings: Problem description; background information; possible approaches to a solution; special requirements; bibliography; and key contact(s).

**PB-235 458/7** PC E03/MF A01  
National Academy of Sciences-National Research Council, Washington, D.C.  
**Report of the Joint Continuing Committee for Scientific Cooperation: Ministry of Science and Technology, Republic of Korea and National Academy of Sciences**  
Staff summary rept.  
1974, 54p  
Contract AID/csd-2584  
Staff Summary Report of Meeting and Workshop (1st) Held at Seoul, Korea on 13-16 November 1973. Sponsored in part by Ministry of Science and Technology, Seoul (Korea), and National Academy of Science, Washington, D.C. Board on Science and Technology for International Development.

Descriptors: \*Scientific research, \*Technology development, \*Meetings, Cooperation, South Korea, United States, Research and development, Project planning, Economic factors, Education, Reviews.  
Identifiers: Priorities.

The report is a staff-prepared summary of the first meeting and workshop of the Korea - U.S. Joint Continuing Committee for Scientific Cooperation, held in 1973 in Seoul, Korea. Appendices include a list of briefing papers, Korean participants, and a selected press coverage of the meeting and workshop.

**PB-235 504/8** PC A05/MF A01  
Milbrew, Inc., Juneau, Wis. Amber Labs. Div.  
**Protein Production from Acid Whey via Fermentation**  
Environmental protection technology series  
Sheldon Bernstein, and Thomas C. Everson. May 74, 89p EPA-660/2-74-025  
Grant EPA-S-800747  
Prepared in cooperation with National Environmental Research Center, Corvallis, Oreg.  
Paper copy available from GPO \$1.25 as EPA-600/2-74-025.

Descriptors: \*Fermentation, \*Dairy products, \*Feeding stuffs, \*Industrial waste treatment, Pilot plants, Proteins, Cheeses, Byproducts, Livestock, Cost estimates, Amino acids, Investments, Food processing.  
Identifiers: \*Cheese whey, \*Water pollution control.



# APPROPRIATE TECHNOLOGY ABSTRACTS

From the operation of a demonstration pilot plant over extended periods of time, it has been shown that yeast may be grown on an acid whey or sweet whey medium in a continuous, deep tank aerated fermentor. Variations in fermentation conditions, strain selection, and medium composition produced cell concentrations of several billion cells per milliliter. By a process of evaporation and spray drying the whole fermented whey mass and the utilization of the evaporator condensate to dilute incoming condensed whey, a high grade, non-toxic, protein feed material may be produced without any effluent streams. Amino acid analyses and protein efficiency ratios are presented for this feed material. This whey fermentation is one means of converting large quantities of a potential environmental pollutant into a useful and needed product.

**PB-235 575/8** **PC A07/MF A01**  
Oklahoma Cooperative Fishery Unit, Stillwater.  
**Paunch Manure as a Feed Supplement in Channel Catfish Farming**  
Environmental protection technology series.  
Robert C. Summerfelt, and S. C. Yin. May 74,  
129p EPA-600/2-74-046  
Grant EPA-R-800746  
Paper copy available from GPO \$1.60 as EP-1.23:660/2-74-046.

Descriptors: \*Catfishes, \*Aquaculture, \*Water pollution, Feeding stuffs, Agricultural wastes, Beef cattle, Water quality, Animal nutrition, Diets, Food processing, Ponds.  
Identifiers: Water pollution effects(Animals), Paunch manure, Slaughtering house wastes.

Part A of the report examines the feasibility of using dried paunch at 10, 20, and 30% levels in feed for pond-rearing yearling channel catfish to market-size, and at a 10% level for cage-culture of yearling catfish. Part B describes the effects of fish culture, using standard feeds and paunch-containing feeds, on water quality of fish ponds. In all, one physical, one bacteriological, and fifteen chemical parameters were measured. Regardless of feed type, pond-reared fish grew faster than the cage-reared fish. There was no significant difference in final weights attained by fish given standard, and 10 and 20% paunch feeds but fish given 30% paunch were significantly smaller. Neither the pond culture nor the cage culture caused deterioration in water quality in any of the ponds to any appreciable degree in one growing season of 24 weeks. (Modified author abstract)

**PB-235 801/8** **PC E02/MF A01**  
Pacific Southwest Forest and Range Experiment Station, Berkeley, Calif.  
**Some Woods of Hawaii...Properties and Uses of 16 Commercial Species**  
Forest Service general technical rept. (Final)  
Roger G. Skolmen. 1974, 34p Rept no. FSGTR-PSW-8

Descriptors: \*Wood, \*Wood products, \*Hawaii, Eucalyptus wood, Ash wood, Redwood, Mechanical properties, Woodworking, Shrinkage, Durability.

Information is given for 16 Hawaii-grown species, both native and introduced, of present or potential commercial importance. Descriptive notes include tree characteristics, history, size, and growth rates; the timber volume available in Hawaii; and accessibility for logging. Wood properties, including appearance, weight, shrinkage, strength, workability, seasoning, durability, and finishing, are explained with reference to well-known woods, and present and potential uses are described. An appendix includes technical data. Each species is illustrated in color.

**PB-235 922/2** **PC A04/MF A01**  
National Academy of Sciences, Washington, D.C. Board on Science and Technology for International Development.  
**The Peace Corps: Perspectives for the Future**  
Final rept.  
Aug 74, 74p Rept no. PC/BOSTID-74-01  
Contract ACTION-74-043-0023

Descriptors: \*Foreign assistance, \*Developing countries, \*Organizational effectiveness, Reviews,

Policies, Performance evaluation, Recommendations, Economic development, Technical assistance.  
Identifiers: \*Peace Corps, Volunteer service.

The report reviews the character, direction, and activities of the Peace Corps in relation to prospective developing country needs, as input to current agency reassessment of long-range policy and operations plan. It recommends that the Peace Corps maintain its distinctive character as a volunteer program supplying middle-level manpower with the two-fold purpose of helping other countries and promoting international understanding. It recommends that the Corps adopt measures to enhance effective use of generalist volunteers, provide sectoral areas such as agriculture, health and nutrition, more technical support and planning, assure self-monitoring and performance data collection, and continue operation on a bilateral basis with binational management of local units.

**PB-236 143/4** **PC A04/MF A01**  
Cornell Univ., Ithaca, N. Y. Center for Environmental Quality Management.  
**Workshop on Research Methodologies for Studies of Energy, Food, Man, and Environment**  
Final rept. on Phase 1  
David Pimentel, Walter R. Lynn, William K. MacReynolds, Marie T. Hewes, and Sharon Rush. Aug 74, 58p\*  
Grant NSF-GB-43996

Descriptors: \*Food supply, Food consumption, Farm crops, Nutrition, Production, Corn, Rice, Wheat, Potatoes, Fertilizers, Farm management.  
Identifiers: \*Energy conversion efficiency, Energy requirements.

With overpopulation, energy shortages, and environmental degradation the world's population is fast losing its capacity to feed itself. To produce more food to feed the rapidly growing world population will require intensifying crop production on limited arable land. This will, in turn, place a greater demand upon the already scarce energy resources. Hence, a need clearly exists to make more effective use of the world's known energy and land resources. Discussed are research needs concerning energy inputs in crop production, alternatives in food production for effective use of energy and environmental resources, and estimates of energy needs to increase world food production.

**PB-236 285/3** **PC A03/MF A01**  
Department of Housing and Urban Development, Washington, D.C. Office of International Affairs.  
**Special Report on Techniques of Aided Self-Help Housing. Some Examples of U.S. and Overseas Experience**  
Ervin Bueneman. Nov 73, 29p

Descriptors: \*Self help housing, \*Developing countries, Houses, Construction, Projects, Puerto Rico, Guatemala, Tanzania, Trinidad.

In some developing countries, helping families build their own homes became the basis of national housing policy long after the departure of the experts who first introduced and developed the concept. Organized aided self-help housing programs are considered a way by which many families could obtain decent housing through their own efforts at a relatively small capital expenditure. The report describes selected experiences in Puerto Rico, Trinidad/Tobago, Guatemala, Tanzania, and selected U.S. areas.

**PB-236 391/9** **PC A05/MF A01**  
PADCO, Inc., Washington, D.C.  
**Guidelines for Establishing and Administering Land Development Agencies in the Developing Countries**  
Ideas and methods exchange  
Alfred P. Van Huyck, and Milton Kaplan. Aug 73, 76p IME-69  
Contract HUD-H-1899  
Sponsored in part by Agency for International Development Washington, D.C.

Descriptors: \*Land development, \*Developing countries, \*Services, Urban areas, Urban planning, Public administration, Reviews, Recommendations, Management guidelines.  
Identifiers: \*Government agencies.

The report examines the crisis in urban land from the perspective of one instrument available to the public sector - the Land Development Agency - through which the public interest can be represented in the urban land market. It is not intended to be an exhaustive study of world experience, but rather a basic review of the key issues of concern and the preparation of recommendations and guidelines for the establishment and administration of Land Development Agencies. Its purpose is to stimulate interested persons to undertake further studies leading to the improvement of land development agencies in the developing countries.

**PB-236 978/3** **PC A02/MF A01**  
Department of Housing and Urban Development, Washington, D.C. Office of International Affairs.  
**HUD International Country Reports. Panama**  
1971, 15p Rept no. HUD-168-SF  
See also PB-236 979.

Descriptors: \*Housing studies, \*Urban development, \*Panama, Developing countries, Urban construction, Economic conditions, Construction industry, Construction materials, International trade, Foreign market surveys, Foreign investments.  
Identifiers: \*International country reports.

The report presents information on various aspects of housing and urban development in Panama. The information was developed from the analysis of foreign documents, team visits, document exchanges under bilateral agreements and from informal contacts. Each study describes geography, climate, population, the government system, some economic data, and housing and urban development activity, including financial institutions.

**PB-236 980/9** **PC A02/MF A01**  
Department of Housing and Urban Development, Washington, D.C. Office of International Affairs.  
**HUD International Country Reports. Peru**  
1971, 18p Rept no. HUD-275-IA  
See also PB-236 981.

Descriptors: \*Housing studies, \*Urban development, \*Peru, Developing countries, Urban construction, Economic conditions, Construction industry, Construction materials, International trade, Foreign market surveys, Foreign investments.  
Identifiers: \*International country reports.

The report presents information on various aspects of housing and urban development in Peru. The information was developed from the analysis of foreign documents, team visits, and document exchanges under bilateral agreements and from informal contacts. Each study describes geography, climate, population, the government system, some economic data, and housing and urban development activity, including financial institutions.

**PB-237 042/7** **PC A11/MF A01**  
Colorado State Univ., Fort Collins. Solar Energy Applications Lab.  
**Design and Construction of a Residential Solar Heating and Cooling System**  
Semi-annual progress rept. 1 Jan-31 Jul 74  
George O. G. Loif. Aug 74, 233p\* NSF/RANN/SE/GI-40457/PR/74/2, NSF/RA/N-74-104  
Grant NSF-GI-40457

Descriptors: \*Solar heating, \*Residential buildings, Design criteria, Construction, Specifications, Drawings, Engineering drawings, Heat exchangers, Heat pumps, Lithium bromide, Water heaters, Performance evaluation, Computerized simulation, Cost estimates, Antireflection coatings.  
Identifiers: \*Solar air conditioning, Solar collectors, Solar water heaters.

The first integrated system providing heating and cooling to a building by use of solar energy has been designed and installed in a residential-type building at Colorado State University. Solar heated liquid supplies heat to air circulating in the building



and to a lithium bromide absorption air conditioner. Service hot water is also provided. Approximately two-thirds of the heating and cooling loads are expected to be met by solar energy, the balance by natural gas. The report contains details of design and principles of operation. A breakdown of costs of equipment and its installation is provided.

**PB-237 299/3** PC A17/MF A01  
American Association on Mental Deficiency, Washington, D.C.  
**International Research Seminar on Vocational Rehabilitation of the Mentally Retarded**  
Final rept.  
George Soloyanis, John E. Loth, and Melvin Cohen. 1972. 394p\*  
Grant SRS-22-55092

Descriptors: \*Rehabilitation, \*Mental deficiency, \*Meetings, Vocational guidance, Social welfare, Schools, Government policies, International comparison, Specialized training, Planning.  
Identifiers: \*Mentally retarded persons.

The overall purpose of the conference was to provide a forum for the exchange of information emanating from the United States and overseas research concerning the vocational rehabilitation of mentally retarded individuals. More specifically, the research explored were those investigations pertaining to programs, operations and services of rehabilitation facilities.

**PB-238 103/6** PC A08/MF A01  
National Center for Energy Management and Power, Philadelphia, Pa.  
**Technology for the Conversion of Solar Energy to Fuel Gas**  
Annual rept.  
31 Jan 74, 153p NSF/RANN/SE/GI34991/  
PR73/4, NSF/RA/N-74-153  
Grant NSF-GI-29729, NSF-GI-34991

Descriptors: \*Methane, \*Manufactured gas, \*Gas production, \*Plants(Biology), \*Digestion(Decomposition), Fermentation, Newsprint, Absorbent papers, Grasses, Garbage, Chlor-ella, Algae, Fertilizers, Wastes, Feeding stuffs, Mud, Agricultural wastes, Effluents, Anaerobic processes, Digesters, Fresh water, Brackish water, Sea water, Production rate, Alkalinity, Carbon dioxide, Nitrogen, Carbon, Solar energy, Chemical analysis, Photosynthesis, Biodeterioration.  
Identifiers: \*Solar energy conversion.

The formation of methane by biological conversion of a number of organic materials has been examined. The materials exposed to the anaerobic fermentation process included paper, grass, household garbage, fresh water algae, water hyacinth, seaweed, cattle manure, dry manure, dry dog food. These materials have been examined separately and in various combinations. During operation of the digester, the amount and composition (methane and carbon dioxide) of the gases produced by the fermentation were determined and extensive chemical analyses of the composition of the liquid contents of the digesters were carried out. Similar chemical analyses of the various materials fed to the digester were carried out as well as analyses of the sea water used in several of the studies.

**PB-238 291/9** PC A06/MF A01  
Bacardi Corp., San Diego, Puerto Rico.  
**Rum Distillery Slops Treatment by Anaerobic Contact Process**  
Environmental protection technology series  
T. G. Shea, E. Ramos, J. Rodriguez, and G. H. Dorion. Jul 74, 109p EPA-660/2-74-074  
Grant EPA-R-800935  
Paper copy available from GPO.

Descriptors: \*Anaerobic processes, \*Industrial waste treatment, \*Distilleries, \*Digestion(Decomposition), Cost estimates, Process charting, Settling, Suspended sediments, Design, Performance evaluation, Reaction kinetics, Digestion(Decomposition), Waste water, Cost effectiveness, Methane, Byproducts, Pilot plants.  
Identifiers: Rum distilleries, \*Water pollution control, Chemical oxygen demand, Biological industrial waste treatment.

The general objectives of the present study were to develop an anaerobic digestion process for the treatment of the rum distillery slops stream at the pilot scale, and to establish design criteria for the full-scale application of the process. Both bench and pilot-scale experimental studies were conducted with the anaerobic contact process flow sheet (incorporating biomass recycle) to permit determination of the Monod kinetic constants and the kinetic relationships describing the anaerobic treatment of the slops. The process kinetics were used to examine the operating and performance characteristics of a plant-scale application. A process flow sheet was established and design criteria developed as the basis for estimating the cost of a plant-scale installation. The process kinetic relationships and the economic analysis were used to structure a cost-performance relationship to examine tradeoffs between cost, performance, and selected design variables.

**PB-238 591/2** PC A02/MF A01  
Kansas State Univ., Manhattan. Cooperative Extension Service.  
**Guidelines for Land Disposal of Feedlot Lagoon Water**  
Research rept.  
William L. Powers, Russell L. Herpich, Larry S. Murphy, David A. Whitney, and Harold L. Manges. 1974, 9p OWRT-A-046-KAN(2)  
Contract DI-14-31-0001-3516

Descriptors: \*Industrial waste treatment, \*Agricultural wastes, Irrigation, Waste water, Lagoons(Ponds), Nutrients, Salts, Water quality, Inorganic nitrates, Inorganic phosphates, Kansas, Farms.  
Identifiers: \*Feedlot wastes, Water quality data.

Guidelines are provided for feedlot operators who dispose of lagoon, water on agricultural lands. The design of lagoon, pumps, and irrigation systems are not discussed. Because lagoon water contains such plant nutrients as nitrogen, phosphorus, and potassium, its application on agricultural land, in correct amounts, can increase crop yields. However, because it also contains salts of sodium, calcium, and magnesium, too much lagoon water can pollute the soil. The salt accumulation from lagoon water is most likely to occur in dry areas where precipitation is not adequate to leach the salts downward below the root zone. Guidelines on how to dispose of such lagoon water to minimize the chance of reducing the land's productivity are given. The guidelines are based on present irrigation-water-quality standards and on data collected from various feedlots in Kansas.

**PB-238 849/4** PC A11/MF A01  
National Academy of Sciences, Washington, D.C.  
**African Agricultural Research Capabilities**  
1974, 240p\* Rept no. ISBN-0-309-0224-X  
Contract AID/csd-2584

Descriptors: \*Agriculture, \*Research projects, \*Developing countries, \*Africa, Research needs, Education, Soils, Agronomy, Land use, Farm crops, Agricultural economics, Manpower, Water management, Grains(Food), Vegetables, Livestock.

The study focuses on the question of how agricultural science and specifically agricultural research can contribute most effectively to the progress of the African nations and peoples. It covers the following topics: (1) Agricultural and educational priorities; (2) role of non-African agencies in coordination of agricultural research and education; (3) appropriate channels of communication and cooperation among nations and institutions within and outside of Africa; (4) means by which research and education can be applied most effectively to African agricultural development; and (5) a broad assessment of the scientific manpower needs of the research systems and institutions recommended by the NAS Committee.

**PB-238 909/6** PC A06/MF A01  
Florida Atlantic Univ., Boca Raton. Dept. of Biological Sciences.  
**Biological Control of Aquatic Vegetation**  
Thomas T. Sturrock. Aug 73, 107p EPA/660/3-74-007

Grant EPA-R-801036

Descriptors: \*Aquatic weeds, \*Weed control, \*Florida, Plant growth, Fungi, Plant pathology, Culture media, Morphology, Microorganisms, Pest control.  
Identifiers: \*Aquatic weed control, Hydrilla verticillata, Eichhornia crassipes, Water hyacinth, Deuteromycetes(Imperfect fungi), Alternaria, \*Biological weed control, Biological pest control.

Laboratory studies were conducted to determine optimal growth conditions of Hydrilla verticillata and Eichhornia crassipes on both entire plants and detached leaf cultures. Techniques were then developed for surface sterilization of both the entire and plant parts for both species. Numerous weed infested habitats in Florida were examined for signs of aquatic plant diseases. These studies indicated various environmental factors as well as possible microbial pathogens as a source of plant tissue debilitation. No significant microbial pathogen was observed for H. verticillata, however, a pathogenic species of a Deuteromycete was isolated from a leaf spot on E. crassipes. Characterization of this fungus revealed it to be an Alternaria species of the order Moniales. Infection was produced via agar block techniques and aerosol spore suspensions. Experiments are described concerning the virulence and host range for these fungal pathogen.

**PB-238 917/9** PC A21/MF A01  
International Road Federation, Washington, D.C.  
**1974 World Survey of Current Research and Development on Roads and Road Transport**  
Dec 74, 497p\*  
Contract DOT-FH-11-7656, CPR-11-2665  
Sponsored in part by contract DOT-FH-11-6744.

Descriptors: \*Highways, \*Highway transportation, \*Highway planning, Research, Reviews, Bibliographies, Bridges(Structures), Foreign countries, Objectives, Organizations, Recommendations, Construction materials, Roads, Project planning, Developing countries, Civil engineering, Tunnels.

The tenth in a series of annual reports on research and development projects conducted by governmental, academic and commercial research agencies in 72 countries is reported by surveyors of the International Road Federation and the International Road Research Documentation program of the OECD. The report includes listings of 4,668 projects, classified in accordance with the subject area classification of the Transportation Research Board, which includes these listings in their retrieval system.

**PB-239 465/8** PC A16/MF A01  
Little (Arthur D.), Inc., Cambridge, Mass.  
**An Overview of Alternative Energy Sources for LDCs**  
7 Aug 74, 372p\* Rept no. ADL-C-77105  
Contract AID/ta/C-1089

Descriptors: \*Electric power generation, \*Energy supplies, \*Developing countries, Energy sources, Tidal power generation, Geothermal power plants, Geothermal prospecting, Wastes, Methyl alcohol, Coal gasification, Wind power generation, Solar energy conversion, Solar heating, Solar power generation, Nuclear electric power generation, Steam electric power generation, Bangladesh, Chile, Costa Rica, Dominican Republic, Ghana, India, Ivory Coast, Kenya, Pakistan, Brazil, Korea, Niger, Philippines, Sri Lanka, Thailand, Underdeveloped nations, International trade, Energy consumption, Fuel consumption, Electric power demand, Forecasting, Predictions, Economic development.  
Identifiers: Energy resources.

The report presents an overview of alternative energy sources of types which could be of significant value to lesser-developed countries in adjusting to the impact of sharply higher world market prices of petroleum. It presents a highly condensed review of non-conventional energy technologies, together with some limited commentary on the relevance of the more conventional technologies in new lesser-developed country (LDC) economic settings. It also provides a summary on a country-by-country basis of the current economic



posture and energy resources array in fifteen LDC's selected as being broadly representative--geographically and in terms of petroleum-price impacts--of the quite wide range of situations that need to be considered.

**PB-239 472/4** **PC A08/MF A01**  
National Academy of Sciences, Washington, D.C. Advisory Committee on Technology Innovation.  
**More Water for Arid Lands, Promising Technologies and Research Opportunities**  
1974, 161p  
Contract AID/csd-2584

Descriptors: \*Water supply, \*Water conservation, \*Arid land, Agriculture, Irrigation, Waste water reuse, Surface water runoff, Water wells, Remote sensing, Water loss, Soil water, Evapotranspiration, Salt water, Percolation, Controlled atmospheres.

Little known but promising technologies for the use and conservation of scarce water supplies in arid areas are the subject of this report. Not a technical handbook, it aims to draw the attention of agricultural and community officials and researchers to opportunities for development projects with probable high social value. Each technology is presented in a separate chapter and arranged under the following topics: methods, advantages, limitations, stage of development, needed research and development, selected readings (a short list of reviews and general articles) and contacts (a list of individuals or organizations the panelists know to be involved in relevant research).

**PB-239 478/1** **PC A05/MF A01**  
National Academy of Sciences, Washington, D.C.  
**Workshop on Education and Training Needs for Philippine Environmental Programs Held in Manila, Philippines, May 27-31, 1974**  
May 74, 84p  
Contract AID/csd-2584

Descriptors: \*Meetings, \*Environmental issues, \*Philippines, Workshops, Scientists, United States, Training needs, Engineers, Education, Administrators, Resources, Developing countries, Problem solving, Planning.

The workshop was designed to bring together Philippine and American scientists, engineers, educators, and administrators for collaborative identification of problems and issues relevant to environmental education and training needs, development of possible alternative solutions to the problems, and consideration of ways to strengthen the host country's capacity to plan and manage environmental education programs.

**PB-239 492/2** **PC A05/MF A01**  
National Academy of Sciences, Washington, D.C.  
**Scientific and Technical Information Needs and Resources in the Republic of China (Taiwan)**  
1974, 86p  
Report on a Sino-U.S. Workshop, held in Washington, D.C. on 24-26 April, 1973.

Descriptors: \*Information systems, \*Information retrieval, Information centers, Manpower, Taiwan, Documentation, Libraries, Meetings, Data processing.

The National Academy of Sciences - National Research Council and the Academie Sinica of the Republic of China jointly sponsored a workshop on the Scientific and Technical Information Needs and Resources of the Republic of China (Taiwan) from 16 April to 14 May, 1973. The workshop consisted of a three-day conference in Washington, D.C. and technical visits to 33 U.S. information organizations before and after the conference. Purposes of workshop were: (1) To identify the needs for S and T information in Taiwan and the resources required to meet them; (2) to examine and make recommendations that Taiwan might take to strengthen its national scientific and technical information infrastructure, and to establish linkages with information systems, centers, and services in other countries; and (3) to identify areas for future cooperative efforts between counterpart U.S. and Chinese institutions.

**PB-239 493/0** **PC A12/MF A01**  
Monsanto Research Corp., Dayton, Ohio. Dayton Lab.  
**Development of Low-Cost Roofing From Indigenous Materials in Developing Nations**  
Annual rept. no. 1, May 73-May 74  
G. L. III Ball, Robert A. Cass, J. P. R. Falconer, D. C. Royle, and Ival O. Salyer. 30 Jul 74, 274p  
Rept no. MRC-DA-440  
Contract AID/CM/ta-C-73-12  
Prepared in cooperation with Washington Univ., St. Louis, Mo.

Descriptors: \*Roofing, \*Developing countries, \*Construction materials, Feasibility, Research, Natural fibers, Fillers, Substitutes, Low cost housing, Project planning, Africa, Asia, Latin America, Reviews.  
Identifiers: \*Indigenous materials.

The report covers the first year of a 1973-1976 research effort to use indigenous fibers and fillers with low-cost binders to produce improved roofing for developing countries. The ultimate goal of the development program is to make available in at least three countries, one each in Africa, Asia and Latin America, a roofing system which is an economically and technically acceptable alternative to the extensively used corrugated galvanized iron, a material which has undesirably high foreign exchange costs, insufficient use of indigenous materials and manpower, and poor thermal insulation and durability. Phase 1 goals are summarized, and a work plan for Phase 2 is given.

**PB-239 557-T** **PC A99/MF A01**  
Fogarty International Center, Bethesda, Md.  
**A Barefoot Doctor's Manual**  
1974, 972p\* Rept no. DHEW/NIH-75-695  
Trans. of unidentified Chinese language mono., n.p., n.d. 960p. Pub. by Institute of Traditional Chinese Medicine of Human Province (Chinese People's Republic).

Descriptors: \*China, \*Medical personnel, \*Clinical medicine, Anatomy, Hygiene, Diagnosis(Medicine), Therapy, Education, Drugs, Pharmacology, Diseases, Medical services, Public health, Manuals, Physicians.  
Identifiers: \*Health care delivery systems, Paraprofessional personnel, Herbs, Medicinal plants, Acupuncture.

The book was prepared by the Institute of Traditional Chinese Medicine of Hunan Province, China and contains instructions on health care for the use by paraprofessional personnel. It contains sections on anatomy, hygiene, diagnostic techniques, therapeutic techniques, birth control, diagnosis and treatment of common diseases and Chinese herbal medicine.

**PB-239 799/0** **PC A08/MF A01**  
Federal Working Group on Pest Management, Rockville, Md.  
**Proceedings of the National Conference on Protective Clothing and Safety Equipment for Pesticide Workers Held in Atlanta, Georgia, May 1-2, 1972**  
Final rept.  
Jun 72, 170p Rept no. FWGPM-72-3

Descriptors: \*Pesticides, \*Industrial hygiene, Personnel, Protective clothing, Protective masks, Industrial atmospheres, Safety devices, Dust control, Ventilation, Materials handling, Accidents, Safety engineering, Meetings, Warehouses, Storage, Transportation.

The report presents papers concerning safety and hygiene in the pesticide industry. Topics include: Effects of different kinds of pesticide exposures on man as determined through laboratory testing; protection of individuals who mix or apply pesticides in the field; protective clothing, goggles, gloves and foot coverings-their value during handling and use of pesticides; effectiveness of respirators and similar gear for protection against inhaling pesticides; ventilation and dust control systems to protect workers in enclosed areas; innovations in pesticide application equipment that protect workers from exposure to pesticides; and where protective clothing and safety equipment must be available; occupational health and safety standards that

apply to pesticide exposure situations, regulations governing hazardous chemicals in loading and transportation operations, rules for workers in warehouses, attitudes and practices of pesticide applicators; pesticide worker accidents; acceptance of safety programs; and concern of the Federal Government. Eight recommendations for Federal interdepartmental action were made by the Safety Panel.

**PB-239 875/8** **PC A06/MF A01**  
Maryland Univ., College Park. Bureau of Business and Economic Research.  
**Effects of Economic Development Upon Water Resources (An Interindustry Approach to Modeling Economic-Environmental Systems)**  
Technical rept.  
John H. Cumberland, and Bruce N. Stram. 1974, 111p TR-18, OWRT-B-007-MD(1)  
Contract DI-14-31-0001-3089

Descriptors: \*Water pollution, \*Management planning, \*Water resources, \*Air pollution, \*Economic development, Economic models, Mathematical models Statistical methods, Classifications, Sources, Residues, Waste disposal, Economic analysis.  
Identifiers: \*Water pollution abatement, Environmental models, \*Environmental management, Formats.

A theoretical model is presented of interrelationships between economic and environmental models useful for water management, together with basic data on 130 types of pollutants from 70 different industries. The purpose is to get good data and analytic methods needed to improve environmental management. The first step has been to devise a materials balance accounting structure to provide a format for emissions. The collected and internally developed data have been used to create a simple two-stage model of the emissions process. High priority in environmental research appears appropriate for the evaluation of damage functions associated with various reported emissions levels. Integration of this additional information with the data on hand should lead to the improvement desired in environmental management.

**PB-239 883/2** **PC A03/MF A01**  
Massachusetts Inst. of Tech., Cambridge. Center for International Studies.  
**Radio Broadcasting and Telecommunications in Nepal**  
George Rathjens, Robert Butman, and Ramesh Vaidya. Jan 75, 27p Rept no. C/75-3

Descriptors: \*Radio broadcasting, \*Telecommunication, \*Education, Nepal.

The report presents observations on Nepali radio broadcast services in general taking into account program content and language, geographical coverage, and questions relating to taxation and duties on radios and their manufacture. It also discusses radio for education in the schools and two-way communications.

**PB-240 113/1** **PC A04/MF A01**  
Oregon State Univ., Corvallis. Water Resources Research Inst.  
**Animal Waste Conversion Systems Based on Thermal Discharge**  
L. Boersma, E. W. R. Barlow, J. R. Miner, and H. K. Phinney. Sep 74, 58p OWRT-B-039-ORE(1)  
Contract DI-14-31-0001-4121  
Also available as Oregon State Univ., Corvallis. Agricultural Experiment Station. Special rept. no. 416.

Descriptors: \*Agricultural wastes, \*Manufactured gas, \*Heat recovery, \*Solid waste disposal, \*Feeding stuffs, Algae, Cooling water, Electric power plants, Methane, Byproducts, Digestion(Decomposition), Digestors, Anaerobic processes.  
Identifiers: \*Waste heat utilization, \*High protein supplements, \*Manure.

Society faces many problems related to its growth in numbers and standard of living. Of major concern is environmental degradation resulting from pollution and the consumptive use of non-renew-



## APPROPRIATE TECHNOLOGY ABSTRACTS

able natural resources. An animal waste management scheme was developed on the premise that one solution to these problems is the development of integrated production systems with recycled sources. The waste product of one industry must become the raw material for another. The feasibility of using waste heat from steam electric plants to sustain a food-producing complex which recycles nutrients is analyzed. Specifically, it is proposed to use microorganisms to convert animal waste into a high protein animal feed and a methane-rich fuel gas. Waste heat from steam electric plants is used as a low cost source of energy for maintaining stable, elevated temperatures in anaerobic digestion and single cell protein production units. Benefits to society include: improved efficiency of energy use and food production, recycling of raw materials, and conservation of non-renewable resources.

**PB-240 244/4** **PC A03/MF A01**  
National Academy of Sciences, Washington, D.C.  
**An International Centre for Manatee Research: Report of a Workshop held 7-13 February 1974 in Georgetown, Guyana, South America 1974, 39p\***  
Contract AID/csd-2584

Descriptors: \*Weed control, \*Aquatic animals, \*Meetings, Mammals, Ecology, Research, Biology, Guyana, Developing countries, Tropical regions. Identifiers: \*Aquatic weed control, \*Biological weed control, \*Manatee, Trichechus.

A workshop was held in Georgetown, Guyana February 7-13, 1974 to discuss the potential usage of the manatee as a natural means of aquatic weed control as well as of the great advantages, apart from its utilitarian potential, that may be derived through basic biological research endeavors. The report outlines the various fields of research which need to be undertaken if the manatee is to be brought into effective use and the establishment of an International Centre for Research on Manatees has been recommended.

**PB-240 365/7** **PC A07/MF A01**  
Humboldt County Dept. of Public Works, Eureka, Calif.  
**Rural Storage and Collection Container Systems**  
Final rept.  
Bartle Wells. 1975, 126p EPA/530/SW-81d  
Grant PHS-EC-00271  
Prepared in cooperation with Bartle Wells Associates, San Francisco, Calif., and Garretson, El-mendorf, Zinor, and Reibin, San Francisco, Calif. Report on Humboldt County Solid Waste Demonstration Project. See also PB-212 398.

Descriptors: \*Solid waste disposal, \*Refuse disposal, \*Containers, \*Collection, \*Rural areas, Storage, Management planning, Cost analysis, Trucks, Earth fills, Hauling, Compacting, Financing, California.  
Identifiers: Waste transfer stations, Sanitary landfills, \*Humboldt County(California).

This report describes the development and financing of a county solid waste collection system for rural areas. The objective of the system was to substitute an environmentally sound method of solid waste disposal for the unsound practice of using small, random, burning dumps. The report shows that this can be accomplished. It presents a detail description of the storage and collection containers used, the construction of the container sites, and an economic analysis of the advantages/disadvantages of the use of small and large containers. The report also presents a comprehensive analysis of the development of the County financial plan.

**PB-241 055/3** **PC E03/MF A01**  
National Center for Energy Management and Power, Philadelphia, Pa.  
**Technology for the Conversion of Solar Energy to Fuel Gas**  
Quarterly rept. no. 3.  
31 Oct 73, 145 NSF/RANN/SE/GI34991/PR/73/3, NSF/RA/N-73-113  
Grant NSF-GI-29729, NSF/GI-34991  
See also PB-238 545.

Descriptors: \*Methane, \*Organic wastes, \*Manufactured gas, \*Digestion(Decomposition), Digesters, Equipment, Design, Drawings, Performance evaluation, Plants(Botany), Agricultural wastes.

Development of methods for the economic production of methane gas by the anaerobic digestion of organic matter is discussed. The organic matter is derived from the conversion of solar energy to plant material via photosynthesis. An initial source of feed material is available in the form of organic solid wastes, the by-products of food, feed and wood production. The conversion of waste materials to fuel gas via anaerobic digestion represents a potential solution not only to the energy problem, but simultaneously to the solid wastes problem.

**PB-241 120/5** **PC A17/MF A01**  
Virginia Polytechnic Inst. and State Univ., Blacksburg. Center for Urban and Regional Studies.  
**Urban Systems Research: Report of the Binational (U.S./Australian) Urban Systems Symposium (1st)**  
Final rept.  
John W. Dickey, and Roy W. R. Muncey. Apr 75, 398p\* NSF/DS-74/01  
Prepared in cooperation with Commonwealth Scientific and Industrial Research Organization, Victoria (Australia). Div. of Building Research, and Department of Science, Canberra (Australia).

Descriptors: \*Urban planning, \*Urban development, \*Meetings, Land use, Urban growth, Developing countries, Community development, Citizen participation, United States, Australia.

In June, 1974 the First Binational (U.S./Australian) Symposium on Urban Systems Research was held in Washington, D.C. There was 29 presentations made by experts from the two countries. These covered such areas as (1) land use models (Lowry-type, NBER, PLUM, EMPIRIC, the Direct Trip Allocation Model, System Dynamics), (2) growth allocation techniques, (3) growth management, (4) the experience of practitioners with models, (5) urban problems and practices in developing countries, (6) the United Nations' Habitat '76 Program, (7) organizing government, (8) community involvement, (9) gaming, (10) land use law, and (11) national growth policies. It was concluded from the symposium that much more work needs to be done in urban modeling, especially because of rapid changes in uncontrollable, external factors.

**PB-241 579/2** **MF A01-NTIS**  
National Academy of Sciences, Washington, D.C.  
**In Search of Population Policy. Views from the Developing World**  
Aug 74, 120p\* Rept no. ISBN-0-309-02242-8  
Contract AID/csd-3600  
Library of Congress Catalog Card No. 74-10125.  
Paper copy available from National Academy of Sciences, Washington, D.C. 20418 \$4.25.

Descriptors: \*Population problems, \*Developing countries, \*Meetings, Policies, Population migrations, Population distribution, Mortality, Morbidity, Health statistics, Urbanization, Employment, Education, Foreign aid, Latin America, Middle East, Africa, Southeast Asia, South Asia.

The volume derives from five regional seminars held in South Asia, the Middle East, Latin America, Africa, and Southeast Asia. Reporting the results of the meetings, it provides information on policy aspects of population issues viewed at the national, community, family, and individual levels. Among the issues discussed are effects of migration and population distribution, reductions of mortality and morbidity, improvement of health care, effects of urbanization, employment, the role of education, and effects of foreign assistance. Participants include doctors, religious and civic leaders, demographers, journalists, educators.

**PB-241 715/2** **PC A04/MF A01**  
Wisconsin Univ., Madison. Water Resources Center.  
**Aquatic Plant Harvesting: Development of High-Speed Harvesters and Processing and Utilization of Harvested Vegetation**  
Technical rept.

Donald F. Livermore, Richard G. Koegel, Hjalmer D. Bruhn, Se H. Sy, and Harold F. Link. Mar 75, 52p WIS-WRC-75-02, OWRT-B-078-WIS(2)  
Contract DI-14-31-0001-3947, Grant NSF-GI-39193

Descriptors: \*Aquatic weeds, \*Harvesting, Cost analysis, Agricultural machinery, Design, Production, Test methods, Efficiency, Vegetation, Dewatering, Separation, Distillation, Utilization, Feeding stuffs, Nutrients, Mulches.

Research was conducted to reduce the cost of aquatic plant harvesting by increasing harvester productivity through high-speed harvesting, by reducing the handling costs of the harvested vegetation, and/or by improving the potential for economic utilization of the vegetation. Also described are the design, construction, and testing of a craft for concentrating and collecting pre-cut, floating aquatic vegetation at speeds several times those of conventional harvesters. Recommendations are made for increasing the mechanical efficiency of this machine. A moisture prediction function was developed for aquatic vegetation subjected to pressure. Presented are data on the chemical constituents of the vegetation which were compared to conventional forage materials. Possible uses of the cut vegetation are enumerated.

**PB-242 403/4** **PC A08/MF A01**  
Massachusetts Inst. of Tech., Cambridge.  
**Proceedings of the M.I.T. Symposium on Strategies for A.I.D. Programs in Selected Areas of Science and Technology. Volume 2. Housing, Transportation and Water Resources**  
J. P. Ruina. Apr 74, 164p  
Contract AID/ta-1067  
Report on Technology Adaptation Program. See also Volume 1, PB-242 403 and Volume 3, PB-242 404.

Descriptors: \*Technology utilization, \*Economic development, \*Meetings, Housing planning, Developing countries, Self help housing, Highway planning, Transportation planning, Urban transportation, Water resources, Water management, Economic models, Construction.  
Identifiers: Incremental construction.

The report contains materials on the part of a technology utilization symposium devoted to housing, transportation, and water resources, principally in the developing nations.

**PB-242 405/9** **PC A03/MF A01**  
Massachusetts Inst. of Tech., Cambridge.  
**Proceedings of the M.I.T. Symposium on Strategies for A.I.D. Programs in Selected Areas of Science and Technology. Volume 4. Food Technology**  
J. P. Ruina. Apr 74, 31p  
Contract AID/ta-1067  
Report on Technology Adaptation Program. See also Volume 3, PB-242 404.

Descriptors: \*Technology utilization, \*Food industry, \*Meetings, Developing countries, Nutrition, Technology transfer, Fermentation, Feeding stuffs, Econometrics, Proteins, Nutritional deficiency diseases.  
Identifiers: Single cell proteins, Malnutrition.

The subject matter involves the processing, preservation and manufacture of foods. In the context of technology transfer from industrialized countries to low-income countries one might formulate two basic objectives: The first is to increase food supply, or more accurately, the supply of certain nutrients to populations. A second objective is the combatting of malnutrition.

**PB-242 973/6** **PC A02/MF A01**  
North Central Forest Experiment Station, St. Paul, Minn.  
**How Craftsmen and Home Hobbyists Can Make and Use Wood Plastic Composite Materials**  
Forest service general technical rept. (Final)  
Howard N. Rosen. Jan 74, 13p\* Rept no. FSGTR-NC-10



Descriptors: \*Wood based composites, \*Plastics, \*Handicrafts, Gluing, Woodworking, Impregnating, Wood processing industry, Curing, Equipment, Wood finishing, Safety, Machining, Workshops, Efficiency.  
Identifiers: Hobbyists.

A technique for producing craft items of wood-plastic composites in the home, school, or small shop is described. Suggestions are given on how to build the treating equipment for under \$30. Wood impregnation, processing techniques, gluing, finishing, and safety are discussed. The ease and versatility of producing crafts from wood-plastic composites are demonstrated by example projects.

**PB-243 367/0** **PC A06/MF A01**  
National Academy of Sciences, Washington, D.C.  
**Report of the Joint Ad Hoc Committee for Scientific and Technical Cooperation: Council for Scientific and Industrial Research of Ghana, Universities of Ghana and NAS**  
Summary rept.  
1975, 119p  
Contract AID/ccsd-2584

Descriptors: \*Industrial research and development, \*Ghana, \*Technical assistance programs, Planning, Research projects, Agriculture, Industries, Remote sensing, Instruments, Information centers, Developing countries.

The report contains the proceedings of the NAS-CSIR Committee meeting held in Washington, D.C., July 1-3, 1974. The CSIR and NAS have since 1971, engaged in a joint collaborative program aimed at relating science and technology more effectively in solving economic and social problems in Ghana. The workshops are aimed at examining the institutional mechanism for formulating science policy, identifying research priorities and the problems in the execution of research in Ghana, finding out how best agricultural research results could be made available to user agencies.

**PB-243 409/0** **PC A03/MF A01**  
Washington Univ., St. Louis, Mo. Center for the Biology of Natural Systems.  
**Agricultural Resources Consumed in Beef Production**  
William Lockeretz. Jun 75, 48p\* Rept no. CBNS-AE-3  
Grant NSF-GI-043890

Descriptors: \*Beef, \*Irrigation, \*Fertilizers, \*Feeding stuffs, Farm crops, Water supply, Production, Food consumption, Natural resources, Arid land, Forage grasses, Proteins, Food supply, Wheat plants, Soybean plants, Correlation techniques.

The consumption of energy, fertilizer, water, and cropland has been calculated for nine different beef production systems. These systems vary with respect to region, type of pasture and cropland, and feeding program. Among the nine systems, there is a considerable range of resource intensiveness, depending on factors such as type of pasture, type of cropland (irrigated vs. dryland) and kinds of roughages and protein supplements. Data are also presented on the consumption of the same resources in the production of wheat and soybeans in the same regions, on comparable land to that used to raise cattle feeds. In all cases, the resource consumption for beef is very much greater than for a wheat/soybean mixture of equivalent protein value.

**PB-243 442/1** **PC A03/MF A01**  
National Academy of Sciences, Washington, D.C.  
**The Winged Bean; A High-Protein Crop for the Tropics**  
1975, 50p  
Contract AID/csd-2584

Descriptors: \*Leguminous plants, \*Food, Nutritive value, Proteins, Oils.

Edible legumes are excellent sources of dietary protein and oils. Many nutritionists expect them to play an increasing role in meeting food needs in this time of food shortages and widespread malnutrition. In addition to the major cultivated edible legumes--soybeans, peanuts (groundnuts), peas, and beans--there are more than 50 minor tropical legumes that have received little scientific attention (mainly because researchers have concentrated on more conventional crop species, especially cereals). This report focuses on the exceptional promise offered by one of these: the winged bean.

**PB-243 470/2** **PC A13/MF A01**  
Hawaii State Advisory Task Force on Energy Policy, Honolulu.  
**Alternate Energy Sources for Hawaii**  
Report of the Committee.  
Feb 75, 276p NSF/RA/G-75/003  
Grant NSF-ISR71-03844-A03  
Prepared in cooperation with Hawaii State Dept. of Planning and Economic Development, Honolulu, and Hawaii Natural Energy Inst., Honolulu.

Descriptors: \*Energy sources, \*Hawaii, \*Energy conversion, Waste disposal, Plants(Botany), Hydroelectric power, Wind power, Nuclear power, Geothermal energy conversion, Solar energy conversion, Solar sea power plants, Waterwave energy conversion, Coal, Energy storage, Environmental impacts, Economics, Energy policy.  
Identifiers: Solid wastes.

This is a report of the Committee on Alternate Energy Sources for Hawaii, which was established by the Governor's State Advisory Task Force on Energy Policy to help respond to problems created by the Arab oil embargo. Fourteen studies were undertaken -- ten on alternate energy sources, and four more general studies. Included as appendices to the report are all the studies on the potential of different energy sources to minimize the State's near-total dependence on seaborne petroleum. These alternate sources of energy are: solid waste; bioconversion; hydroelectric; wind; geothermal; solar collectors; ocean thermal energy conversion; waves, tides, currents, osmosis; coal; nuclear.

**PB-243 639/2** **PC A04/MF A01**  
Washington Univ., St. Louis, Mo. Center for the Biology of Natural Systems.  
**A Comparison of the Production, Economic Returns, and Energy Intensiveness of Corn Belt Farms That Do and Do Not Use Inorganic Fertilizers and Pesticides**  
William Lockeretz, Robert Klepper, Barry Commoner, Michael Gertler, and Sarah Fast. Jul 75, 68p\* Rept no. CBNS-AE-4  
Grant NSF-GI-043890

Descriptors: \*Farms, \*Livestock, \*Fertilizers, \*Pesticides, \*Agricultural economics, Corn plants, Production, Inorganic compounds, Pest control, Market value, Crop value, Correlation techniques, Probability theory, Regression analysis, Working time, Farm crops.  
Identifiers: Corn Belt, \*Organic farming.

The report compares crop production on a sample of 16 mixed crop-livestock farms in the Corn Belt on which no inorganic fertilizers and almost no pesticides are used, to that of a matched sample that uses conventional fertilization and pest control practices. In the 1974 crop year, the market value of the crops raised per acre was slightly higher on the conventional sample (an average of 8%), but this difference was not statistically significant at the 90% probability level. There was no difference between the two group's crop production returns, that is, value of production less operating costs. The energy intensiveness (defined as energy input divided by value of production) on the farms that do not use fertilizers is an average of one-third as much as that of the conventional group.

**PB-243 701/0** **PC A06/MF A01**  
Cornell Univ., Ithaca, N.Y.  
**Science and Technology for International Development: A Selected List of Information Sources in the United States and Bibliography of Selected Materials (Second Edition)**  
Feb 75, 124p\*  
Sponsored in part by Agency for International Development, Washington, D.C. Office of Science and Technology.

Descriptors: \*Information systems, \*Scientific research, \*Technology development, \*Management methods, \*Technology transfer, Developing countries, Libraries, Organizations, Bibliographies, Documents, Policies, Services, Industrial development, Public health, Agriculture, Manpower utilization, Natural resources management, Regional planning, Medicine, Education.  
Identifiers: Science and technology.

This report is part of a continuing effort to identify and document the services of relevant information sources in the U.S. which may be of use to scholars and practitioners working on policies for science and technology in developing countries.

**PB-243 702/8** **PC A06/MF A01**  
Nebraska Univ., Lincoln.  
**The Development of a High Protein Isolate from Selected Distillers By-Products**  
Final rept.  
James G. Kendrick. Jul 75, 122p NSF/RA/T-75-021  
Grant NSF-GI-42036, NSF-AER-74-10456-A1

Descriptors: \*Proteins, \*Grains(Food), Food, Economic analysis, Distilleries, Tables(Data), Corn, Wheat, Byproducts, Materials recovery, Extraction, Nutritive value, Toxicity, Chemical properties, Operating costs, Feeding stuffs, Food processing.

Using an alkaline extraction procedure, a human-consumable protein concentrate can be obtained from corn and wheat distillers by-products. The recovery process yielded approximately 54% and 36% of the original protein (as a protein concentrate) from corn and wheat distillers by-products, respectively. Nutritional and functional tests on the distillers concentrate indicated that it can be used in the fortification of cereal-based snacks, cookies and bread, and as an emulsion binder/extender in emulsified meat products. The alkaline extraction of distillers by-products also yielded new forms of animal feeds, i.e. from corn, a 12% protein high-fiber feed, a 4% protein - 33% carbohydrate syrup, and a 6% protein - 20% carbohydrate whey fraction.

**PB-243 846/3** **PC A06/MF A01**  
Fairleigh Dickinson Univ., Teaneck, N.J. Dept. of Economics.  
**Construction and Economic Development. A Case Study and International Comparisons of Productivity**  
Final rept.  
Peter J. Cassimatis. Aug 75, 106p Rept no. FDU/DE-75/01

Descriptors: \*Economic development, \*Developing countries, \*Construction industry, Construction practices, Economic surveys, Greece, Technological advances, Econometrics, Economic models, Interindustry economics, Employment profiles, Earnings, Comparative studies, Productivity, Foreign countries, Demand(Economics), National economy.

The relationship of construction and aggregate economic activity is the subject of this study with particular emphasis on the role of the construction industry plays in the growth of a developing country (Greece). The report analyzes the demand characteristics of construction, based on econometric equations, interindustry relationships, employment and earnings. Calculations show the relative share of construction in the national economy and comparisons are made of construction productivity with other industries of the United States and 12 OECD countries.

**PB-243 936/2** **PC A06/MF A01**  
Western Forest Products Lab., Vancouver (British Columbia).  
**Recent Advances in Foliage Utilization**  
J. L. Keays, and G. M. Barton. Feb 75, 105p\*  
Rept no. VP-X-137  
Summary in French.

Descriptors: \*Vegetation, \*Feeding stuffs, \*Food supplements, Veterinary medicine, Decision making, Medicine, Food supply, Value, Food consumption, Cost analysis, Food processing, Utilization, Assessments, Food industry, Canada.



Identifiers: Muka, Global, Cosmetics, Foliage.

The primary purpose of the report to draw attention, at the decision-making level, to a little-known and neglected field of massive opportunity - foliage utilization. Foliage derivatives can be used in a wide range of products utilized in animal feeds, cosmetics, medicine, and veterinary practice. Of greatest immediate interest is the conversion of foliage to muka, used as a vitamin supplement in animal feeds. Of greatest importance on a global basis is the fact that every ton of foliage used in animal feeds can release one tone of grain to increase world food stocks. Foliage can be converted to muka in a few simple processing steps, at costs which should be competitive with alternative animal feed supplements. The potential value of muka manufactured in Canada could be in the hundreds of millions of dollars per year, and the addition to world food stocks in the millions of tons per year. In the case of muka manufacture and use, the problem is primarily one of assessment, recognition of opportunity, and application of developed technologies.

**PB-244 263/0** **PC A05/MF A01**  
Wisconsin Univ., Madison. Dept. of Botany.  
**Nutritional Ecology of Nuisance Aquatic Plants**  
Final rept. 28 Sep 72-31 Oct 74  
Gerald C. Gerloff. Jun 75, 88p EPA-660/3-75-027  
Grant EPA-R-800504

Descriptors: \*Aquatic weeds, \*Ecology, Nutritional requirements, Bioassay, Wisconsin, Lakes, Recommendations, Plants(Botany), Algae, Nutrients, Plant growth, Potassium, Phosphorus, Nitrogen, Tables(Data).  
Identifiers: Myriophyllum spicatum, Elodea occidentalis, Sea grasses, \*Aquatic weed control, Bioindicators.

Contents:  
Critical concentrations of essential elements in various aquatic plants;  
Comparisons of procedures for assaying nutrient availability in aquatic environments;  
Potassium as a growth-limiting nutrient for Myriophyllum spicatum in a eutrophic lake;  
Competition for growth-limiting amounts of nutrients made available at very low concentrations in mixed cultures of aquatic plants;  
Growth of Elodea occidentalis at low concentrations of inorganic nutrients made available in solution-replacement cultures;  
Comparisons of rates of phosphorus and rubidium uptake by several macrophytes and algae.

**PB-244 294/5** **PC A05/MF A01**  
Cornell Univ., Ithaca, N.Y. Program on Policies for Science and Technology in Developing Nations.  
**A Methodology for Formulating and Implementing Science Policy for a Small Developing Country (Costa Rica)**  
Franklin J. Ahimaz. Jun 75, 76p  
Contract AID/csd-3391

Descriptors: \*Developing countries, \*Policies, \*Scientific research, Foreign aid, Cooperation, Costa Rica, Public opinion, Citizen participation, Regional development, National economic policies, Education.  
Identifiers: Limon Province(Costa Rica).

A review of current methodologies by larger developing countries decision-making bodies and international programs in developing nations has identified several approaches to policy formulation and implementation. These approaches are grouped and discussed. A new approach--the modified bubble-up approach to policy formulation and implementation--was initiated as a pilot effort in Limon Province, Costa Rica. Preliminary results indicate that this approach has promise for application to other small developing nations.

**PB-244 557/5** **PC A15/MF A01**  
Midwest Research Inst., Kansas City, Mo.  
**Guidelines for the Disposal of Small Quantities of Unused Pesticides**  
Final rept.

Edward W. Lawless, Thomas L. Ferguson, and Alfred F. Meiners. Jun 75, 342p\* EPA/670/2-75/057  
Contract EPA-68-01-0098  
Errata sheet inserted.

Descriptors: \*Solid waste disposal, \*Pesticides, \*Herbicides, \*Insecticides, Manuals, Decontamination, Waste treatment, Incinerators, Neutralizing, Oxidation, Reduction(Chemistry), Degradation, Management planning, Classification, Toxicity, Water pollution control, Dust.  
Identifiers: \*Liquid waste disposal, Pesticide spills.

This study has compiled and organized information that will be useful to responsible authorities in advising the layman (particularly the homeowner and small farmer) how to dispose properly of small amounts of surplus and unwanted pesticides and pesticide containers, and in treating pesticide spills. The report brings together available information on pesticide disposal methods and on over 550 individual pesticides, and evaluates this information in terms of the experience and equipment that the average layman has. Fourteen pesticide disposal procedures are described and procedures for disposal of containers and cleanup and treatment of spills are included. Preferred and alternate disposal procedures are recommended for over 550 pesticides. The report includes a cross-index of over 1,600 pesticide names, tables showing the chemical composition and properties pertinent to disposal of the selected pesticides and bibliography of 166 references.

**PB-244 668/0** **PC-GPO**  
Soil Conservation Service, Washington, D.C. Engineering Div.  
**Engineering Field Manual for Conservation Practices**  
Final rept.  
Apr 75, 1075p\* Rept no. SCS/ENG/FM-E

Descriptors: \*Soil conservation, \*Water conservation, Surveys, Civil engineering, Manuals, Hydraulic structures, Irrigation, Drainage, Maintenance, Design criteria, Levees, Hydraulics, Soil erosion, Terracing, Earth work, Strip cropping, Construction, Ponds, Construction materials.

The manual was developed to provide guidance in the use of basic engineering principles, techniques and procedures for the planning, design, installation and maintenance of soil and water conservation practices. The material is limited to the types of conservation practices used most often and does not cover the more complex practices. The manual is intended primarily for use at the SCS field office level and is appropriate for both engineers and technicians. Standard survey practice is presented. A method of estimating runoff including necessary charts is included. Basic hydraulics and soil mechanics are discussed. Water disposal systems for erosion control and drainage are included. Development of water supplies by ponds, wells and springs is thoroughly covered. Construction and construction materials are also discussed. Each chapter includes appropriate tables, charts, curves and forms used in solving planning and design problems.

**PB-244 691/2** **PC A05/MF A01**  
Oklahoma State Univ., Stillwater. Dept. of Agricultural Engineering.  
**Improved Design and Operating Criteria for Rural Water Districts**  
Completion rept.  
James E. Garton. Jun 75, 77p OWRT-B-028-OKLA(2)

Descriptors: \*Water consumption, \*Rural areas, Design criteria, Water supply, Dairies, Industrial water, Demand(Economics), Pumping, Oklahoma.  
Identifiers: \*Water districts, Payne County(Oklahoma), Dairy industry.

Data were obtained on Rural Water District No. 3, Payne County, Oklahoma. There was a significantly different pattern of usage for three classes of customers. The average monthly usage per tap ranged from 8768 to 19183 gallons for dairies, 4357 to 11983 gallons for Class A taps, and 2537 to 4160 gallons for Class B taps. The average monthly usage per person ranged from 1424 to

2821 gallons for Class A taps and from 989 to 1664 gallons for Class B taps. Optimal design values for peak demand ranged from: 1.0 to 1.5 gallons per minute per tap; 1.3 to 1.8 gallons per minute per Class A tap; 0.6 to 0.9 gallons per minute per Class B tap; 0.6 to 0.8 gallons per minute per person; 0.5 to 0.7 gallons per minute per person, Class A tap; and 0.3 to 0.6 gallons per minute per person, Class B tap. The optimal period off-peak pumping time is from 10 p.m. to 7 a.m., a period of 9 hours.

**PB-244 696/1** **PC A02/MF A01**  
Arizona Univ., Tucson. School of Renewable Natural Resources.  
**Development of a Bibliographic Information System for Water Yield Improvement Practices**  
Project completion rept. Jul 72-Jun 75  
Linda M. White, David B. Thorud, and Peter F. Ffolliott. Aug 75, 11p OWRT-A-042-ARIZ(9)  
Contract DI-14-31-0001-3803

Descriptors: \*Water supply, \*Water management, \*Bibliographies, Information retrieval, Watersheds, Forest land, Land use, Vegetation, Arid land, Evapotranspiration, Wildlife, Environmental impacts, Arizona.  
Identifiers: \*Water yield.

Development of the Watershed Management Information System (WAMIS) began in 1972. WAMIS is designed to serve a variety of users who are interested in water and natural resource research in Arizona. WAMIS is a computerized bibliographic reference retrieval system which provides literature searches for users, in the form of individualized computer printouts of citations and abstracts, based upon a user's special interests. The literature covered in WAMIS includes effects of land management practices and vegetation management on water and other related resources, such as forage production, wildlife habitat, timber production, and recreational use. Research done in Arizona has been emphasized. General procedures used in banking and retrieval are described. Types of search requests have varied, including topics such as wildlife use of ponderosa pine forests, environmental and vegetation effects on evapotranspiration, hydrologic modeling, Arizona water quality data, the effect of timber cutting practices on runoff, and revegetation of treated pinyon-juniper vegetation.

**PB-244 880/1** **PC A03/MF A01**  
New Mexico State Univ., University Park. Water Resources Research Inst.  
**Utilization of Water in a Semi-Arid Region**  
Technical completion rept.  
H. D. Fuehring. Sep 75, 40p WRRI-059, OWRT-B-029-N-Mex.(1)

Descriptors: \*Water consumption, \*Farm crops, \*Semiarid land, \*Dry farming, Water conservation, Evapotranspiration, Surface water runoff, Grain sorghum plants, Nitrogen, Moisture, Field tests, Tables(Data), New Mexico, Southern High Plains Region(New Mexico).  
Identifiers: \*Water utilization, Atrazine.

A five-year study in the Southern High Plains (annual rainfall of 16 inches) using combinations of bare micro-watershed and growing bed widths resulted in increased crop yields on the growing beds as the proportion of micro-watershed was increased. However, yields for the entire area (including both bed and shed) decreased. Limited work indicated the possibility of also cropping the shed areas and it was concluded that this would be a more practical way of utilizing micro-watersheds. Grain sorghum and sunflowers were successful dryland crops on both beds and sheds while wheat was more suitable as a crop on the sheds than on the beds. The use of an antitranspirant (atrazine) gave promising results on grain sorghum but further work is needed.

**PB-245 004/7** **PC A02/MF A01**  
Department of Transportation, Washington, D.C.  
Office of the Assistant Secretary for Policy and International Affairs.



**Suggestions for Temporary Erosion and Siltation Control Measures. (Erosion Y Sedimentación: Medidas Temporarias De Control)**  
1975, 24p  
Text in Spanish.

Descriptors: \*Erosion control, \*Sedimentation, \*Highways, \*Developing countries, Slopes, Construction, Manuals, Soil erosion, Diagrams, Efficiency, Latin America.

The manual was prepared as an aid to field personnel engaged in the construction of highways in Latin America. It provides suggestions on the most efficient ways of providing emergency care against erosion and sedimentation by prompt treatment of the slopes. The booklet contains 24 pages of diagrams of various types of problems and methods of controlling them. The report was designed for distribution to the governments of Latin American countries through the cooperation of the Agency for International Development.

**PB-245 083/1** **PC A08/MF A01**  
Dynatech R/D Co., Cambridge, Mass.  
**Fuel Gas Production from Solid Waste**  
Final rept. 28 Jun 73-31 Dec 74  
R. G. Kispert, S. E. Sadek, L. C. Anderson, and D. L. Wise. 31 Jan 75, 167p Dynatech-1258, NSF/RA/N-74/268  
Grant NSF-C827  
See also PB-238 563.

Descriptors: \*Fuels, \*Energy sources, \*Manufactured gas, \*Reclamation, \*Solid waste disposal, Garbage, Anaerobic processes, Pilot plants, Design, Drawings, Cost analysis, Production rate, Materials recovery, Aluminum, Glass, Plastics, Regional planning, Fuel gas, Economic models, Computerized simulation.  
Identifiers: Solid wastes, Geographic locations, Refuse disposal, Waste recycling.

Six major program tasks are discussed: (1) Preliminary engineering analysis and economic evaluation of a full-scale fuel gas from solid waste facility; (2) Pilot plant design, procurement, and initial operation; (3) Supporting laboratory experiments and studies at the University of Massachusetts and M.I.T.; (4) Confirmation of the economic model for the full-scale fuel gas from solid waste facility; (5) Evaluation and specification of a proof-of-concept pilot plant; (6) Application of the computer model to full-scale plant studies.

**PB-245 128/4** **PC A03/MF A01**  
California Univ., San Diego, La Jolla.  
**Proceedings of Conference on Enzyme Engineering as Related to Food and Energy Production, Held at the University of California, San Diego, on 22-25 July, 1974**  
William D. McElroy. 1974, 27p NSF/RA/T-74-012

Descriptors: \*Enzymes, \*Energy sources, \*Food, Meetings, Manufactured gas, Methane, Photosynthesis, Water, Hydrogen, Biochemical fuel cells, Cellulose, Decomposition, Agricultural wastes, Nitrogen fixation.  
Identifiers: \*Enzyme technology, \*Immobilized enzymes.

The reports presents the conference's recommendations and summary background information for further research on enzyme engineering as related to food and energy production. Primary emphasis is in generation of methane, biophotolysis of water, efficient utilization of cellulose, biochemical fuel cells, nitrogen fixation, and the purification and stabilization of enzymes and enzyme systems.

**PB-245 176/3** **PC A25/MF A01**  
Robert S. Kerr Environmental Research Lab., Ada, Okla.  
**Wastewater Use in the Production of Food and Fiber--Proceedings**  
Environmental protection technology series.  
Jun 74, 590p Rept no. EPA/660/2-74-041  
Proceedings of the Conference held at Oklahoma City, Oklahoma on March 5-7, 1974.

Descriptors: \*Waste water, \*Water consumption, \*Aquaculture, \*Irrigation, \*Meetings, \*Agriculture,

Sewage treatment, Farm crops, Production, Forage grasses, Salmon, Catfishes, Fiber crops, Public health, Disease vectors, Shellfish, Metals, Risk, Toxicity.  
Identifiers: \*Waste water reuse, Water utilization, Heavy metals, Sewage irrigation, Public health.

An interdisciplinary group of about 200 persons met to review the present base of scientific knowledge relating to benefits and constraints of using wastewaters for production of food and fiber. There were 27 papers presented by representatives from the fields of public health, engineering, agriculture, aquaculture, and other related scientific disciplines. Papers in two sections on potential restraints cover topics such as historical instances of disease transmission, possible transport of microbial pathogens through the food chain, legal implications, and sociological reactions. The aquaculture section deals primarily with experimental studies including such diverse approaches as culture of daphnia, salmon smolts, and water hyacinth. The agriculture section emphasizes the use of wastewater for crop production and the papers presented include case histories for long-term operating systems, as well as data from experimental studies. In addition to those papers presented at the conference, nine others have been included to make a total of 36 papers in the conference proceedings.

**PB-245 259/7** **PC A07/MF A01**  
Colorado State Univ., Fort Collins. Environmental Resources Center.  
**Individual Home Wastewater Characterization and Treatment**  
Completion rept.  
Edwin R. Bennett, and K. Daniel Linstedt. Jul 75, 148p Completion-66, W75-11852  
Contract DI-14-31-0001-5006  
Prepared in cooperation with Colorado Univ., Boulder. Dept. of Civil and Environmental Engineering.

Descriptors: \*Sewage treatment, \*Waste water reuse, \*Rural areas, Septic tanks, Mountains, Aerobic processes, Residential buildings, Colorado.  
Identifiers: \*Domestic wastes.

Disposal of wastewater from isolated homes in mountain and rural locations in Colorado presents unique and difficult problems. The purpose of the study was to evaluate the flow and pollution patterns from individual homes and to evaluate existing and potential treatment methods. Field evaluation of home wastewater flow and pollution characteristics was accomplished. Data for individual fixtures and appliances were obtained with measurement of many pollutional parameters. A brief evaluation of the home treatment methods was accomplished.

**PB-245 318/1** **PC A03/MF A01**  
Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.  
**The Substitute Structure Method for Earthquake-Resistant Design of Reinforced Concrete Frames**  
Akenori Shibata, and Mete A. Sozen. Oct 74, 38p\* Rept nos. UILU-ENG-74-2027, Structural Research Ser-412  
Grant NSF-GI-299934

Descriptors: \*Concrete structures, \*Reinforced concrete, \*Earthquake resistant structures, Buildings, Framed structures, Columns(Supports), Beams(Supports), Earth movements, Design criteria.  
Identifiers: \*Earthquake engineering, Ground motion.

From the observation that the inelastic response to earthquakes of reinforced concrete elements could be represented by a linear-response model, a procedure was developed in another report which incorporated the effects of inelastic energy dissipation to determine the design force for a single-degree-of-freedom structure using the ordinary linear-response spectrum. The substitute-structure method extends this procedure to multi-degree-of-freedom structures. The proposed method can be used to determine earthquake design-force requirements for individual elements of a R/C structure given a design linear-response spectrum and explicit decisions about tolerable in-

elastic response, with the option of different limits of inelastic response in different structural elements. The paper includes a numerical example demonstrating the determination design forces in a three-story frame and a series of analytical tests of the method using two- to ten-story frames.

**PB-245 593/9** **PC A07/MF A01**  
National Academy of Sciences, Washington, D.C.  
**Arid Lands of Sub-Saharan Africa**  
Staff progress rept. Sep 73-Jun 74.  
1975, 128p\*  
Contract AID/csd-2584  
See also PB-245 594.

Descriptors: \*Arid land, \*Developing countries, \*Foreign aid, \*Africa, Droughts, Project planning, Natural resources, Management planning, International relations, Organizations, Meetings.  
Identifiers: \*SubSaharan Africa.

The Advisory Panel on Arid Lands of Sub-Saharan Africa of the Board of Science and Technology for International Development (BOSTIA) was appointed by NAS in late 1973 in response to a request from AID. The general purpose of the panel was to advise AID on problems of the drought-stricken region of West Africa, and to provide assistance in the design and implementation of U.S. participation in an international, collaborative, scientific effort currently being organized to address the emergency situation.

**PB-245 594/7** **PC A03/MF A01**  
National Academy of Sciences, Washington, D.C.  
**Arid Lands of Sub-Saharan Africa**  
Staff final rept. Jul-Dec 74.  
1975, 50p\*  
Contract AID/csd-2584  
See also PB-245 593, and PB-245 595.

Descriptors: \*Arid land, \*Developing countries, \*Foreign aid, \*Africa, Organizations, Meetings, Droughts, Project planning, Environments, Ecology, Climatology, Production planning, International relations.  
Identifiers: \*SubSaharan Africa.

A report is made by the NAS Advisory Panel on Arid Lands of Sub-Sahara Africa which deals with problems of the long-term development of the Sahel.

**PB-245 595/4** **PC A13/MF A01**  
National Academy of Sciences, Washington, D.C.  
**Arid Lands of Sub-Saharan Africa**  
Staff final rept.  
1975, 286p\*  
Contract AID/csd-2584  
See also PB-245 594.

Descriptors: \*Arid land, \*Developing countries, \*Foreign aid, \*Africa, Meetings, Chad, Mali, Mauritania, Niger, Senegal, Upper Volta, Communications management, Land development, Agriculture, Livestock, Climatology, Transportation, Industries, Sociometrics, Health.  
Identifiers: \*SubSaharan Africa, Sahel(Africa).

A report is made on a 1974 conference on development problems in the Sahel, in Bellagio, Italy. The report is based on analysis and integration of ideas from a large number of proposals for development and aid to the nations of the Sahel. A survey and a critique are made of plans for development in the following areas: communication, transportation, dryland crop production, irrigated crop production, livestock and range production, technological and industrial developments, socio-cultural and health developments, and institutional, policy, and economic structural development.

**PB-245 609/3** **PC A07/MF A01**  
Massachusetts Univ., Amherst.  
**A Survey of the Possible Use of Windpower in Thailand and the Philippines**  
William E. Heronemus. Nov 74, 143p  
Contract AID/ta-c-1143  
Prepared by Massachusetts Univ., Amherst. Dept. of Civil Engineering.

Descriptors: \*Wind power, \*Thailand, \*Philippines, Windpowered pumps, Wind power generation,



Windpower utilization, Windmills, Solar sea power plants, Irrigation, Electric power generation, Design.

This work was performed in an attempt to answer the question: 'Could windpower be used by the peasant farmer in Thailand or the Philippines to improve the quality of his life.' It was found that windpower was being used to a very limited extent in Thailand to move water, thus relieving either a backbreaking manual labor task, or a very expensive out-of-pocket expenditure for fuel for engine driven pumps. No evidence of existing wind pumping could be found in the Philippines.

**PB-246 392/5** PC A04/MF A01  
Colorado State Univ., Fort Collins. Inst. of Rural Environmental Health.

**A Study of Mosquito Prevention and Control Problems Associated with Stream Modification Projects**

Final rept.  
John R. Bagby. Oct 74, 57p\*

Descriptors: \*Mosquitoes, \*Pest control, \*Streams, Water resources, Design, Breeding, Swamps, Channel improvements, Site surveys, Disease vectors, Public health, Insect control.

Recognizing the threat to public health by mosquitoes and other arthropods this study provides methods and techniques that can be utilized in planning and design for modification of streams to reduce or eliminate the breeding areas.

**PB-247 057/3** PC A10/MF A01  
Capital Systems Group, Inc., Rockville, Md.

**Improving the Dissemination of Scientific and Technical Information: A Practitioner's Guide to Innovation**

John M. Strawhorn, Richard L. Omerso, and William A. Creager. 15 Apr 75, 203p\*  
Contract NSF-C950  
See also PB-243 461 and PB-243 469.

Descriptors: \*Research, \*Information services, \*Communications management, Distributing, Information systems, Improvement, Technology innovation, Publishing, Periodicals, Journalism, Computer programming, Errors, Automation, Design, Biproductions, Management methods, Printing, Reproduction(Copying), Marketing, Cost engineering, Trends, Requirements.  
Identifiers: Alternatives, Scientific communication.

The Guide's focus is on the 'primary' dissemination of scientific information: the technical journal or its equivalent. In other words, it deals with the initial recorded transmission of information. The Guide's contents are organized into sections, according to the degree of departure from conventional journal and monographic publishing. Each section is made up of a number of individual entries, describing particular innovations. So far as possible, these systems are separated into their individual components for treatment in separate entries, so that the reader who wishes to avoid radical change will not be forced to consider innovation in terms of conversion to a totally new system.

**PB-247 079/7** PC A02/MF A01  
Research Triangle Inst., Research Triangle Park, N.C.

**RANN Utilization Experience. Case Study No. 16. Transportable Solar Laboratory**  
R. LeChevalier. 1975, 25p NSF/RA/G-75-044  
Grant NSF-C927

Also included in complete report and summary, PB-247 243. PC\$13.00, MF\$2.25. Prepared in cooperation with Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.

Descriptors: \*Technology transfer, \*Solar energy conversion, \*Solar space heating, Solar air conditioning, Laboratories, Test facilities.  
Identifiers: Transportable Solar Laboratory project.

The primary objectives of the Transportable Solar Laboratory (TSL) project are to collect data on the performance of a solar energy conversion system, to test that system and its components in actual operation, and to communicate the potential of solar energy conversion systems to community

leaders in education, engineering, science, government, and industry. The report briefly discusses use of the TSL.

**PB-247 098/7** PC A21/MF A01  
Office of Water Research and Technology, Washington, D.C. Water Resources Scientific Information Center.

**A Selected Annotated Bibliography on the Analysis of Water Resource Systems. Volume 6**

Daniel P. Loucks. Sep 75, 484p\* Rept nos. QWRT/WRISIC-75-201, W76-01517  
See also PB-235 336.

Descriptors: \*Water resources, \*Systems analysis, \*Bibliographies, Abstracts, Optimization, Mathematical models, Urban areas, Waste water, Irrigation, Salinity, Management, Arid land, River basin development, Operations research, Indexes(Documentation), Water supply.

The report is an annotated bibliography consisting of 301 abstracts of selected publications issued in 1973 and 1974 pertaining to the application of systems analysis techniques for defining and evaluating alternative solutions to water resource problems. The first two volumes of the bibliography, having the same title, were published by the Cornell University Water Resources and Marine Sciences Center, Ithaca, New York (Publication 25, August 1969; Publication 35, June 1971); the third, fourth, and fifth volumes were published by the Water Resources Scientific Information Center in December 1972, December 1973, and July 1974, respectively. Both subject and author indexes are provided. Descriptors are listed with each abstract. The abstracted material emphasizes the application of optimization and simulation techniques for assisting the planning and management of water resource systems.

**PB-247 182/9** PC A04/MF A01  
Woods Hole Oceanographic Institution, Mass.

**Preliminary Results with a Pilot Plant Waste Recycling Marine-Aquaculture System**

Technical rept.  
John H. Ryther. Sep 75, 61p WHOI-75-41, NOAA-75103103  
Grant NOAA-04-4-158-5, NSF-GI-43884  
Sponsored in part by Grant NOAA-04-5-158-8.

Descriptors: \*Sewage treatment, \*Waste water reuse, \*Aquaculture, \*Algae, Shellfish, Oysters, Lobsters, Flatfishes, Sea grasses, Nitrogen, Tropical regions, Feeding stuffs, Marine fishes, Diatoms, Field tests, Pilot plants.  
Identifiers: Sea Grant program.

A combined waste recycling-marine aquaculture system capable of complete nitrogen removal from treated domestic wastewater has been developed and tested on a pilot-plant scale over a one-year period. Effluent from secondary sewage treatment, mixed with seawater, is used to grow unicellular marine algae in large, continuous-flow, outdoor mass cultures. Harvest from the algae cultures is fed to oysters and other filter-feeding bivalve molluscs and to secondary crops of flounders or lobsters. Dissolved wastes produced by the animals are assimilated by cultures of commercially-valuable seaweeds. Successful cultures of unicellular algae, mostly diatoms, and seaweeds have been sustained over long periods of time (months) with only minor problems. Bivalve mollusc culture was unsuccessful during the first year of operation. An alternative nitrogen-removal system consisting only of seaweeds fed a continuous flow of secondary sewage effluent mixed with seawater has also been evaluated. Year-round operation would be possible in tropical to semi-tropical climates. In temperate climates, operation of the system is possible only on a seasonal basis.

**PB-247 260/3** PC A03/MF A01  
Research Triangle Inst., Research Triangle Park, N.C.

**RANN Utilization Experience. Case Study No. 17. Solar School Projects**

P. Lawless. 1975, 26p NSF/RA/G-75-045  
Grant NSF-C927  
Also included in complete report and summary, PB-247 243. PC\$13.00, MF\$2.25. Prepared in co-

operation with AAi Corp., Baltimore, Md., Inter-Technology Corp., Warrenton, Va., and General Electric Co., Philadelphia, Pa. Space Div.

Descriptors: \*Technology transfer, \*Solar space heating, \*Solar energy conversion, Schools, School buildings.

In response to the energy crisis of 1973-74, NSF-RANN funded proof-of-concept experiments involving the use of solar energy to supply part of the heating required in four public schools. The purpose of the experiments was to demonstrate that solar heating is a technologically viable option in response to the shortage of fossil fuels. The report briefly reviews results of the experiments.

**PB-247 429/4** PC A06/MF A01  
Smithsonian Institution, Washington, D.C. Office of International and Environmental Programs.

**The Environmental Impact of Rapid Urbanization: Guidelines for Policy and Planning. Based Upon a Case Study of Seoul, Korea, in 1972 and 1973**

Peter H. Freeman. 1974, 103p  
Contract AID/csd-2608

Descriptors: \*Urban planning, \*Developing countries, \*Environments, Urbanization, Municipalities, Korea, Guidelines, Government policies, Local government, Handbooks, Air pollution, Environmental surveys, Waste disposal, Water pollution, Monitoring.  
Identifiers: \*Seoul(Korea), Squatter communities.

Guidelines for preserving the environments of rapidly growing cities in developing countries are clearly needed. This document attempts to set forth such guidelines based largely on a case study of Seoul, Korea, as well as relevant examples from other large cities in the developing world. The guidelines are especially directed to cities whose urbanization has not advanced to the point that major decisions have already been made on large-scale infrastructural technologies, whose physical plans are still tentative and flexible, and whose slums or squatter settlements have not yet created the need to take emergency or remedial measures.

**PB-247 430/2** PC A05/MF A01  
Smithsonian Institution, Washington, D.C. Office of International and Environmental Programs.

**The Environmental Impact of a Large Tropical Reservoir: Guidelines for Policy and Planning. Based Upon a Case Study of Lake Volta, Ghana, in 1973 and 1974**

Peter H. Freeman. 1974, 97p  
Contract AID/csd-2608

Descriptors: \*Dams, \*Lakes, \*Tropical regions, \*Developing countries, Ecology, Monitors, Environmental impacts, Inventories, Surveys, Volta Lake, Ghana.

The report summarizes all possible ecological and related physical environmental impacts of tropical dams and man-made lakes within a framework suited to the needs of the impact-assessment procedure. On the basis of the Volta Lake case study and other published experience, a brief narrative of likely impacts is presented. This is followed by key questions that should be asked to determine impacts. Data requirements and alternative methodologies (e.g., research, survey, inventory, evaluation, monitoring) are given to assist in the design of the assessment study.

**PB-247 431/0** PC A07/MF A01  
Smithsonian Institution, Washington, D.C. Office of International and Environmental Programs.

**Coastal Zone Pollution by Oil and Other Contaminants: Guidelines for Policy, Assessment and Monitoring in Tropical Regions. Based Upon a Case Study in Indonesia, in 1973**

Peter H. Freeman. 1974, 144p  
Contract AID/csd-2608

Descriptors: \*Oil pollution, \*Coasts, \*Tropical regions, \*Developing countries, Policies, Recommendations, Monitors, Bibliographies, Ecology, Prevention, Marine biology, Indonesia.



The report provides guidelines useful to tropical nations for the prevention and control of pollution of coastal waters by oil and other contaminants. It reviews the state of knowledge on the effects of pollution by oil in warm tropical waters, sets forth information needed for determining policies for controlling coastal zone pollution by oil, outlines several policy options and their implications and presents recommendations for monitoring coastal pollution. Included in the report is an Annotated Bibliography on the Biological and Ecological Effects of Oil Pollution in Tropical Waters.

**PB-247 819/6** PC A05/MF A01  
International Rice Research Inst., Los Banos, Laguna (Philippines). Agricultural Engineering Dept.  
**Agricultural Machinery Development Program**  
Terminal rept. 1965-74.  
21 May 75, 97p  
Contract AID/csd-834, AID/csd-2541

Descriptors: \*Agricultural machinery, \*Developing countries, Cost engineering, Power supplies, Rice plants, Farm processing, Production, Farm crops, Economic factors, Tractors, Experimental design, Cultivation, Plows, Agronomy, Harvesters, Philippines, Asia.

The program provided a sharper focus on the development and commercialization of appropriate rice production and processing machines in the developing countries. The main objective of the USAID/IRRI program was to provide simple agricultural equipment for small farms which could be manufactured by local metalworking firms in the developing countries. The program activities were divided in three major areas: (1) machinery design, (2) test and evaluation, and (3) economics of mechanization.

**PB-247 970/7** PC E06/MF E06  
New Mexico Univ., Albuquerque. Technology Application Center.  
**Wind Energy Utilization: A Bibliography with Abstracts. Cumulative Volume 1944/1974**  
Apr 75, 491p\* TAC/W-75-700, NSF/RA/N-75-061

Descriptors: \*Wind power, \*Bibliographies, Wind power generation, Wind turbines, Windmills, Wind-power utilization, Windpowered generators, Windpowered pumps, Energy sources, Energy storage, Abstracts.

To support research and development in resolving energy problems, the Technology Application Center, (TAC), through its Energy Information Center, has developed an energy information base which covers the broad spectrum of the energy field. To compile this bibliography on wind energy, the TAC staff retrieved and evaluated wind information from throughout the world. Significant sources included Scientific and Technical Aerospace Reports, Engineering Index, Government Report Announcements, Energy Abstracts, International Aerospace Abstracts, the Oklahoma State University Synopsis of Energy Research, among others. The bibliography substantiates that much of wind research, as it relates to energy considerations, was accomplished early in this century. Much research is yet to be done. This document includes an annotated bibliography by subject headings, an index of authors, index of corporate sources, index of titles, and index of keywords.

**PB-248 043/2** PC A09/MF A01  
Denver Research Inst., Colo.  
**The Industrial Research Institute in a Developing Country: A Comparative Analysis**  
James P. Blackledge. 31 Aug 75, 191p  
Contract AID/csd-3316

Descriptors: \*Industrial engineering, \*Developing countries, \*Research management, Organizations, Technology transfer, Information systems, Services, Corporations, Banking business, Foreign government, Constraints, Industrial training, Project planning, Objectives, Universities, Financing. Identifiers: Entrepreneurship, Institutes.

The objectives of the study have been to: Analyze a variety of approaches to industrial research which have been tried; identify those factors which have contributed to or inhibited effective coupling of industrial research institutes with industry and developmental interests; differentiate between those types of constraints to development of viable institutes which are country specific and those common problems which have limited the value of these institutes regardless of their geographical location.

**PB-248 135/6** PC A03/MF A01  
Washington Univ., St. Louis, Mo. Center for the Biology of Natural Systems.  
**A Comparison of Organic and Conventional Farms in the Corn Belt**  
William Lockeretz, Robert Klepper, Barry Commoner, Michael Gertler, and Sarah Fast. Jul 75, 30p\* CBNS-AE-6, NSF/RA/N-75-168  
Grant NSF-GI-043890

Descriptors: \*Farm management, \*Pesticides, \*Fertilizers, \*Agricultural economics, Prices, Environmental impacts, Farm crops, Profits, Fuel consumption, Economic factors, Production, Correlation techniques, Nitrogen, Phosphorus, Market value, Corn plants, Potassium, Income, Livestock, Inventories, Diesel fuels, Natural gas, Operating costs. Identifiers: \*Organic farming, \*Conventional farming, Corn Belt.

The widespread use of chemical fertilizers and pesticides has been credited with the high productivity of the U.S. farmer, but recent increases in the prices of these chemicals and concern about their ultimate environmental effect has raised questions about our continuing reliance on them. The paper reports a preliminary investigation of the crop production, profitability, and energy consumption of 16 organic and 16 matching conventional farms in the Corn Belt. This paper is a condensed version of a more detailed report, 'A Comparison of the Production, Economic Returns, and Energy Intensity of Corn Belt Farms That Do and Do Not Use Inorganic Fertilizers and Pesticides.' This report outlines the background of the problem, research methods, findings, results and implications of the study.

**PB-248 257/8** PC A04/MF A01  
National Academy of Sciences, Washington, D.C. Committee on World Food, Health and Population.  
**Population and Food. Crucial Issues**  
Final rept.  
Sep 75, 60p\*  
Contract NSF-C310

Descriptors: \*Food, \*Populations, Food supply, Agriculture, Nutrition, Population growth, Food storage, Foreign aid, Developing countries, International relations, Natural resources, Health, Nutritional deficiency diseases.

The report examines those elements that act as constraints on providing an adequate food supply to the world's peoples, and certain ameliorative measures that might be taken to relieve those constraints. The report deals, in turn, with population; food and health; agricultural resources; factors such as affluence, climate, and aid programs; means to increase food supplies; and certain research priorities. It concludes with five general recommendations.

**PB-248 297/4** PC A09/MF A01  
North Carolina Water Resources Research Inst., Raleigh.  
**Water Supply and Wastewater in Coastal Areas: Proceedings of Southeastern Conference Held on April 2-4, 1975**  
James M. Stewart. 1975, 194p\* NOAA-75120106  
Also pub. as North Carolina Univ. Sea Grant reprint no. 83. Sponsored in part by Coastal Plains Center for Marine Development Services, Washington, D.C.

Descriptors: \*Water supply, \*Water pollution, \*Coasts, \*Meetings, \*Regional planning, Waste water, Reviews, Water quality management, Sewage disposal, Technology assessment, Land use zoning, Environmental impacts, Population

growth, Economic development, Public health, Social welfare, Water resources, Sanitary engineering, Project planning, Ocean environments, Financing. Identifiers: Sea Grant program, \*Environmental protection.

The article details the proceedings of the southeastern conference on Water Supply and Wastewater in Coastal Areas. The Conference was conducted to review the state of the art of proper planning and management of water supply and wastewater disposal in coastal areas. Special attention was paid to defining technological and institutional alternatives, their relation to land use planning and environmental protection, and to identifying those water and wastewater problems of significance in coastal areas. A major problem that was discussed at the conference is associated with increasing population growth and economic development in these areas is the provision of safe and adequate water supplies and management of wastewater discharges in a manner consistent with public health and welfare and environmental protection. Both the presentations and discussion sessions are included in the report.

**PB-248 338/6** PC A13/MF A01  
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.  
**Proceedings of the Conference and Seminar on Techniques and Methodologies for Stimulating Small-Scale Labor-Intensive Industries in Developing Countries, held at Atlanta, Georgia, on March 10-14, 1975**  
Donald E. Lodge, and Kay Ellen Auciello. Sep 75, 295p  
Contract AID/CM/ta-G-73-18  
See also PB-248 339.

Descriptors: \*Developing countries, \*Economic development, \*Industries, Meetings, Technology, Methodology, Stimulation, Information services, Coordination, Project planning, Organizations, Projects, Businesses, Operations, Industrial relations. Identifiers: Small businesses, Case histories.

The principal goals of the conference were: -- To identify, analyze, and compare existing methodologies designed to stimulate small-scale industry; -- to disseminate knowledge about operational and linkage efforts; -- to establish the necessary links for coordination of future efforts of both the organizations in the developing countries and international development organizations, and -- to establish adequate feedback mechanisms for the present and future in order to enhance the design and utilization of the small industry program.

**PB-248 339/4** PC A02/MF A01  
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.  
**Summary of the Conference and Seminar on Techniques and Methodologies for Stimulating Small-Scale Labor-Intensive Industries in Developing Countries, held at Atlanta, Georgia, on March 10-14, 1975**  
Summary rept.  
Donald E. Lodge, and Kay Ellen Auciello. Sep 75, 25p\*  
Contract AID/CM/ta-G-73-18  
See also PB-248 338.

Descriptors: \*Developing countries, \*Industries, \*Meetings, Economic development, Stimulation, Technology, Methodology, Information systems, Projects, Surveys, Coordination, Planning, Businesses, Industrial relations, Operations. Identifiers: Case histories.

The proceedings contain the addresses, papers and reports presented at the meeting, as well as discussion sessions. Conference and Seminar programs, a list of attendees and photographs are included. The conference was designed to present information on successful contemporary programs for the stimulation of small-scale industries in developing countries.

**PB-248 346/9** PC A03/MF A01  
Georgia Inst. of Tech., Atlanta.



**Employment Generation Through Stimulation of Small Industries. Improving the Productivity of a Small Industry in Rural Korea**  
Research study Dec 73-Nov 74  
Herbert Eller, Ross W. Hammond, and Ben E. James, Jr. Dec 74, 41p  
Contract AID/csd-3175  
See also PB-248 347.

Descriptors: \*Employment, \*Developing country, \*Industrial relations, Economic development, Productivity, Projects, Cooperation, Grants, National government, Universities, United States, Korea, Stimulation, International relations, Improvement, Recommendations, Industries, Businesses.  
Identifiers: Employment programs, Georgia Institute of Technology, Soong Jun University, International cooperation, Small businesses.

As part of Georgia Tech's five-year program (US/AID-funded) to expand its existing capabilities in employment generation through small-scale industry development, a cooperative relationship was established with Soong Jun University in Korea. One of the first projects to be initiated by the two institutions was a joint staff research study of a small labor-intensive industry to determine how its productivity could be increased without displacing employment. Because of Soong Jun University's interest in starting an industrial engineering curriculum in its engineering school, it was decided the project team would take an industrial engineering approach in conducting this research effort.

**PB-248 347/7** **PC A03/MF A01**  
Georgia Inst. of Tech., Atlanta.  
**Employment Generation Through Stimulation of Small Industries. Guide to International Statistical Sources and National Development Plans at the International Development Data Center**  
Oct 74, 41p  
Contract AID/csd-3175  
See also PB-248 346, and PB-248 348.

Descriptors: \*Economic development, \*Developing countries, \*Information systems, Statistical data, Indexes(Documentation), Documents, Classifications, Subject indexing, International relations, Sources, Planning, Bibliographies.  
Identifiers: Foreign countries, Georgia Institute of Technology.

The Guide Development Plans at the International Development Data Center provides an index to and brief descriptions of specific statistical sources at IDDC concerning the countries of the Georgia Tech 211(d) counterpart organizations, a project funded by the U.S. Agency for International Development. It should be a useful starting point for researchers seeking such information. The Guide is the result of an inventory of publications to determine gaps in the collection of the International Development Data Center (IDDC). The results provide two major benefits. The first is the development of a guide to the present statistical resources in the IDDC collection. The second is the creation of a checklist for future acquisitions in areas where gaps are apparent.

**PB-248 348/5** **PC A03/MF A01**  
Georgia Inst. of Tech., Atlanta.  
**Employment Generation Through Stimulation of Small Industries**  
Annual rept. no. 1, 23 Feb 73-22 Feb 74.  
22 Mar 74, 50p  
Contract AID/csd-3175  
See also Annual rept. no. 2, PB-248 349, and PB-248 347.

Descriptors: \*Employment, \*Developing countries, \*Industrial relations, Project, Universities, International relations, Organizations, Cooperation, United States, Asia, Africa, South America, Communicative, Economic development, Objectives, Grants, Financing, Industries, Businesses.  
Identifiers: Small businesses, Georgia Institute of Technology.

The primary objective of this program is to strengthen Georgia Tech's demonstrated capability in employment generation through the expansion of the small industry sector. A major effort was made to seek out, establish, and maintain counter-

part and communications networks. To this end, formal agreements to work cooperatively on programs of mutual interest were signed between Georgia Tech, five counterparts in Asia, Africa, and South America. It is intended that these counterpart organizations will provide data and a real-world laboratory for testing and validating industrialization methodologies, relevant training programs, applied small industry research, and the like.

**PB-248 349/3** **PC A05/MF A01**  
Georgia Inst. of Tech., Atlanta.  
**Employment Generation Through Stimulation of Small Industries**  
Annual rept. no. 2, 23 Feb 74-22 Feb 75.  
Feb 75, 98p  
Contract AID/csd-3175  
See also Annual rept. no. 1, PB-248 348.

Descriptors: \*Employment, \*Developing countries, \*Industrial relations, Projects, International relations, Universities, Education, Economic development, Unemployment, Population migrations, Rural areas, Urban areas, Communicative, Management planning, Grants, Objectives, Industries, Businesses.  
Identifiers: Small businesses, Georgia Institute of Technology, Rural to urban migration, Foreign countries.

The primary objective of this two-year-old program is to strengthen Georgia Tech's demonstrated capability in employment generation through the expansion of the small industry sector. This capability is particularly relevant to massive unemployment and rural-to-urban migration problems in many developing countries. The program is integral to the institutional commitment to international education and development.

**PB-248 361/8** **PC A02/MF A01**  
Agricultural Research Service, Washington, D.C.  
**What Has Been Done in Peanut Breeding (Chto sdelano po Selektzii Arakhisa)**  
D. P. Umen. 1975, 12p Rept no. TT-74-52028  
Trans. of Vsesoyuznyi Nauchno-Issledovatel'skii Institut Maslichnykh Kultur. Nauchno-Proizvodstvennyi Sbornik (USSR) n5 p9-12 1933, by A. K. Dhote. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: \*Peanut plants, \*Plant genetics, Peanut oil, Production, Maturation, Volume, Plant growth, Seasonal variations, Translations, USSR.

The industrial and agricultural importance of the peanut has led to an active interest and rapid development in this southern oilseed crop in many countries of the world. In particular much interest was shown in peanuts by the oil-extracting industry of the west-European countries and the USA. The report describes screening varieties for yield and high oil potential; and development of varieties usable as raw materials for the food industry, mechanized cultivation, yield, and early maturity.

**PB-248 362/6** **PC A02/MF A01**  
Agricultural Research Service, Washington, D.C.  
**Technique of Artificial Hybridization in the Peanut (Tekhnika Iskusstvennoi Gibrizatsii Arakhisa)**  
D. P. Umen. 1975, 13p Rept no. TT-74-52017  
Trans. of Vsesoyuznyi Nauchno-Issledovatel'skii Institut Maslichnykh Kultur. Nauchno-Proizvodstvennyi Sbornik (USSR) n5 p29-33 1933, by A. K. Dhote. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: \*Peanut plants, \*Hybridization, Pollen, Removal, Plant genetics, Field tests, Plant reproduction, Plant tissues, Females, Translations, USSR.

The report deals with the problems of technique involved in hybridization of peanut plants without going into the internal processes relating to the sphere of genetics. Applicable to any plant, this technique is determined by the structure of the flower and the biology of its development. In the peanut the technique consists of three stages, viz.

emasculation, pollination and the operation on the inflorescences.

**PB-248 596/9** **PC A18/MF A01**  
American Society of Civil Engineers, New York.  
**Proceedings of the Conference on Interdisciplinary Analysis of Water Resource Systems Held at Colorado University, Boulder, Colorado, on June 19-22, 1973**  
J. Ernest Flack. 1975, 410p OWRT-X-126(3757)(1)  
Contract DI-14-31-0001-3757

Descriptors: \*Water resources, \*Water quality management, \*Meetings, Systems engineering, Multiple purpose reservoirs, Africa, Limnology, Mathematical models, Great Lakes, Geothermy, Economic development, Maline Creek, Civil engineering, Social welfare, Project planning, Law(Jurisprudence), Interactions, Decision making, Missouri, United States, California, Wisconsin River, Fraser River.  
Identifiers: North Atlantic Region(United States), Saint Louis(Missouri), British Columbia.

The Water Resources Systems Committee of the American Society of Civil Engineers' Technical Council on Water Resources Planning and Management saw a critical need for developing an interdisciplinary approach to water resources development. This Conference was intended as an effective means of advancing the systems approach in this area. Formal papers on six interdisciplinary efforts were selected as case studies, around which discussions were built. These six papers include interdisciplinary studies on: (1) Large reservoirs in Africa; (2) limnological modeling of the Great Lakes; (3) geothermal development; (4) the North Atlantic Regional Water Resources Study; (5) Corps of Engineers planning experience in the St. Louis-Maline Creek; and (6) University research in the Wisconsin River and the Lower Fraser River (Brit. Columbia) water quality studies. Discussions are given after each paper. Included also is an introductory article on the interdisciplinary aspects of water resources planning and management.

**PB-248 630/6** **PC A16/MF A01**  
Smithsonian Institution, Washington, D.C.  
**Environmental Aspects of a Large Tropical Reservoir - A Case Study of Volta Lake, Ghana**  
Peter H. Freeman. Sep 74, 360p  
Contract AID/csd-2608  
Errata sheet inserted.

Descriptors: \*Multiple purpose reservoirs, \*Developing countries, \*Volta Lake, \*Environmental impacts, Economic development, Cost engineering, Project planning, Tropical regions, Power supplies, Rivers, Electric power plants, Surveys, Hydrogeology, Sewage treatment, Water supply, Food chains, Aquatic plants, Weed control, Sedimentation, Seismology, Water flow, Bathymetry, Mineral deposits, Salinity, Irrigation, Plankton, Fishes, Africa.  
Identifiers: \*Ghana.

During 1973 the Smithsonian Institution's Office of International and Environmental Programs undertook a case study of the Volta Lake in Ghana. This was one of a series of case studies, carried out for the U.S. Agency for International Development, designed to better understand the environmental impacts of various development projects or situations. The purpose of these studies was to extract lessons which could be translated into guidelines to orient future development, in order to prevent costly and avoidable environmental impacts. The case study approach was chosen in view of the proven advantages of obtaining detailed understanding of a specific development. The Volta Lake was seen to constitute an excellent case study opportunity for a review of the environmental impacts of impounding a tropical river. Impacts in the impoundment area have been well researched and documented, and they are not dissimilar from the known impacts of other African man-made lakes. And like other hydropower schemes, the benefits have been very substantial.

**PB-248 899/7** **PC A04/MF A01**  
Smithsonian Institution, Washington, D.C.



**The Biological and Ecological Effects of Oil Pollution in Tropical Waters. An Annotated Bibliography**

Jul 73, 72p\*  
Contract AID/csd-2608

Descriptors: \*Oil pollution, \*Ecology, \*Marine biology, \*Tropical regions, \*Bibliographies, Altitude, Crude oil, Aquatic animals, Shellfish, Aquatic plants, Marshes, Toxicity, Petroleum products, Shores, Mortality, Cold weather tests, Oil wells, Refineries, Outfall sewers, Bacteria, Fishes, Hydrocarbons, Biodeterioration, Phenols, Oils, Fisheries, Coasts, Oil spills, Environmental impacts. Identifiers: High altitude, Oil water interfaces.

The bibliography does not pretend to be complete nor does it include unpublished surveys recently carried out in Indonesia on oil pollution effects. Citations in the annotated bibliography include oil pollution in colder, high altitude waters as well as tropical waters.

**PB-249 183/5** **PC A05/MF A01**

Georgia Inst. of Tech., Atlanta. Industrial Development Div.

**Small-Scale Industry Grant: Soong Jun University Activities**

Final rept. 10 Jan 74-9 Jan 75  
Yoon Bae Ouh, and Nelson C. Wall. Jan 75, 76p  
Contract AID/ta-C-1062  
See also PB-249 184.

Descriptors: \*Economic development, \*Businesses, \*South Korea, \*Employment, Technical assistance, Project planning, Information centers, Universities, Industrial training, Education. Identifiers: Small businesses, Soong Jun University, Employment programs, Curriculum development.

The main objectives of the project are to generate employment outside metropolitan centers and to provide assistance to small-scale industries in selected areas in Korea. The report describes in detail the background, objectives, and activities of the program and outlines the results achieved and the conclusions reached by the project staff.

**PB-249 184/3** **PC A03/MF A01**

Georgia Inst. of Tech., Atlanta. Industrial Development Div.

**Small-Scale Industry Grant: Baseline Data-Areas of Brazil Served by Educational Foundation of South Santa Catarina**

Jan 75, 27p  
Contract AID/ta-C-1062  
See also PB-249 185.

Descriptors: \*Economic development, \*Technical assistance, \*Brazil, Industries, Statistical data, Classifications, Economic surveys, Employment, Sales, Urban areas, Businesses. Identifiers: Small businesses, Santa Catarina(Brazil).

This report consists of a series of tabular displays of data on the area to be served by the Education Foundation of South Santa Catarina (FESSC.) The data include an identification of existing industry by classification, size, number of firms, number of workers, and total sales. Detailed information by industrial classification is provided for South Santa Catarina, and the cities of Tubarao, Braco do Norte, and Laguna. Industry totals (number of firms, number of employees, and sales of industrial establishments) are given for each city within each of the two municipal association areas. In addition, population and land area data are listed for municipal association areas of Santa Catarina and for all cities within the two municipal association areas comprising the FESSC service area.

**PB-249 185/0** **PC A06/MF A01**

Georgia Inst. of Tech., Atlanta. Industrial Development Div.

**Small-Scale Industry Grant: Fundacao Educacional do Sul de Santa Catarina Activities**

Final rept. 10 Jan 74-9 Jan 75  
Jose Muller, and Nelson C. Wall. Jan 75, 112p  
Contract AID/ta-C-1062  
See also PB-249 186.

Descriptors: \*Economic development, \*Businesses, \*Brazil, Grants, Universities, Developing countries, Industries, Projects, Performance evaluation, Technology, Centers, Industrial training, Education, Organizing, Technical assistance, Management.

Identifiers: Small businesses, Santa Catarina(Brazil), Fundacao Educacional do Sul.

In 1974 the Agency for International Development (AID) funded a contract through which the Georgia Institute of Technology (GIT) was to make \$45,000 grants for small-scale industry programs to two institutions of higher learning to be selected in different geographic regions of the world. This is the final (end-of-the-year) report for the work performed jointly by the staff of the Fundacao Educacional do Sul de Santa Catarina (FESSC) in Brazil and the Georgia Institute of Technology. Additional sections of this report describe the background, objectives, activities scheduled in the program of work, results achieved, and the conclusions reached by the project staff.

**PB-249 186/8** **PC A03/MF A01**

Georgia Inst. of Tech., Atlanta. Industrial Development Div.

**Small-Scale Industry Grant: Administration Project-Stimulating the Growth of Small-Scale Industry**

Final rept. 10 Jan 74-9 Jan 75  
Nelson C. Wall. Jan 75, 30p  
Contract AID/ta-C-1062  
See also PB-249 187.

Descriptors: \*Economic development, \*Developing countries, \*Technical assistance, \*South Korea, \*Brazil, Projects, Universities, Grants, Surveys, Evaluation, Operations, Objectives, Industrial training, Education, Businesses, Industries, Stimulation, Criteria.

Identifiers: Small businesses, Fundacao Educacional do Sul, Santa Catarina(Brazil), Soong Jun University, Seoul(Korea), Georgia Institute of Technology.

The Agency for International Development (AID) funded a contract through which the Industrial Development Division (IDD) of the Engineering Experiment Station at the Georgia Institute of Technology was charged with the responsibility of implementing a specific program of work in the area of 'Stimulating Growth of Small-Scale Industry' by providing technical assistance grants to two counterpart institutions. The administrative portion of the contract was assigned the project number A-1600 by the contracting office at the Georgia Institute of Technology. This is the final report of Year 1 of this project which has been implemented in two different geographic regions of the world. The two selected counterpart institutions were Soong Jun University, Seoul, Korea, and the Fundacao Educacional do Sul de Santa Catarina, Tubarao, Brazil.

**PB-249 288/2** **PC A03/MF A01**

Arizona Univ., Tucson.

**Land Use Problems and Research Needs in the High-Altitude Zone of Ecuador**

Edwin Lamar Smith, Jr, and Jack L. Stroehlein.  
Oct 75, 47p

Descriptors: \*Land use, \*Ecuador, Land, Natural resources, Management, Watersheds, Wildlife, Irrigation, Vegetation, Soils, Developing countries, Forestry, Fisheries. Identifiers: High altitude.

The objectives of the study were: (1) to evaluate the nature and extent of problems associated with use of the high altitude lands of Ecuador, (2) to assess the significance of these problems and the possibilities of solving them through research and/or other types of projects, (3) to analyze priorities and capabilities of various institutions involved in natural resource development and management, and (4) to outline a program for solution of land use problems and identify those areas in which cooperation with external institutions is needed.

**PB-249 317/9** **PC A15/MF A01**

Monsanto Research Corp., Dayton, Ohio. Dayton Lab.

**Development of Low-Cost Roofing from Indigenous Materials in Developing Nations**

Annual rept. no. 2, May 74-Sep 75  
Ival O. Salyer, George L. III Ball, Arthur M. Usmani, and Dennis W. Werkmeister. 18 Dec 75, 349p Rept no. MRC-DA-517  
Contract AID/CM/ta-C-73-12  
See also PB-239 493.

Descriptors: \*Roofing, \*Developing countries, \*Composite materials, Fibers, Fillers, Binders(Materials), Bagasse, Rubber fibers, Thermoplastic resins, Weathering, Cost estimates, Criteria, Philippines, Jamaica, Ghana, Zambia.

This report covers Phase II (May 1974 through September 1975) of a 3-1/2 year research effort to match indigenous fibers and fillers with low cost binders to produce improved roofing for developing countries. The project emphasis during Phase II was on roofing materials development, and establishing the mechanism for the transfer of the technology. Four candidate composite roofing material systems were defined that use between 70 and 100% indigenous material. Outstanding as a filler is the sugar cane residue, bagasse. The primary candidate binders include natural rubber, phenolic, and commercial thermoplastic resins. Accelerated and outdoor aging demonstrate the viability of the candidate systems. The objectives of the technology transfer aspects included defining potential collaborative institutions and individuals of Jamaica, the Philippines, Zambia and Ghana and locating qualified organizations interested in future commercial production of the roofing.

**PB-249 367/4** **PC A03/MF A01**

Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.

**Employment Generation Through Stimulation of Small Industries. Provisional Keyword Index of the Small-Scale Industry Case Studies**

Feb 75, 36p  
Contract AID/csd-3175  
Paper copy also available in set of 3 reports as PB-249 366-SET, PC E99.

Descriptors: \*Employment, \*Industrial relations, \*Economic surveys, Subject indexing, Businesses, Industries, Data acquisition, Developing countries, Projects, Universities, Indexes(Documentation), Terminology. Identifiers: Small businesses, Key words, Case histories.

One of the continuing objectives of the Industry Development Division (IDD) under the U.S. Agency for International Development 211 (d) grant program is to acquire case histories of small-scale industry, particularly those in developing countries. For this project, case material was requested from various organizations in many countries, as well as located in published bibliographies and indexes. This work is the first effort of the International Development Data Center (IDDC) (hence the title Provisional Keyword Index) to abstract and index those case histories currently held in the IDDC collection. The keyword index is in two parts. The first section is an alphabetical list of the keywords and their scope notes. The second section is an alphabetical arrangement of the keywords and their related case history titles.

**PB-249 368/2** **PC A05/MF A01**

Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.

**Employment Generation Through Stimulation of Small Industries. Curricula Research and Development Held at Soong Jun University, Seoul, Korea on 21 April-8 June 1974**

Herbert Eller. Jul 74, 87p  
Contract AID/csd-3175  
Paper copy also available in set of 3 reports as PB-249 366-SET, PC E99.

Descriptors: \*Employment, \*Industrial training, \*Universities, Engineering education, Developing countries, Surveys, Data acquisition, Korea, Meetings, Project planning. Identifiers: Curriculum development, Soong Jun University, Georgia Institute of Technology.



As part of its program of research and guidance to counterpart institutions in developing countries under the auspices of an institutional grant from the U.S. Agency for International Development, the Georgia Institute of Technology sent the author to the Republic of Korea April 21-June 8, 1974. One of his activities was to determine the need for an industrial engineering curriculum at Soong Jun University and to advise the faculty on its development. Meetings were held with the engineering college faculty, the president and his staff, and individual educators in various departments and areas of activity.

**PB-249 369/0** **PC A04/MF A01**  
Georgia Inst. of Tech., Atlanta. Engineering Experimental Station.  
**Employment Generation Through Stimulation of Small Industries. List of Subject Headings Used by the International Development Data Center**  
Linda M. Wagenveld, and Richard Johnston. Feb 74, 62p  
Contract AID/csd-3175  
Paper copy also available in set of 3 reports as PB-249 366-SET, PC E99.

Descriptors: \*Employment, \*Developing countries, \*Industries, Subject indexing, Documentation, Definitions, Information retrieval, Search structure, International relations, Information systems.

The purpose of this list of economics and employment subject headings is to provide definitions of terms used. The compilation should enable catalogers to be consistent in selecting subject headings, and enable card catalog users to be more efficient in searches. The list is compiled from industry and labor subject headings for publications now in the collection of the International Development Data Center. Many of the terms are used at the Georgia Institute of Technology and may have different or conflicting meanings in an international orientation.

**PB-249 731/1** **PC A08/MF A01**  
Agricultural Research Service, Washington, D.C.  
**Cotton Boll Rot. Laying Out a Trial of a Method of Control (La Pourriture des Capsules du Cotonnier: Essai de Mise en Place d'une Methode de Lutte)**  
J. Cauquil. 1975, 152p\* Rept no. TT-75-55027  
Trans. of Coton et Fibres Tropicales (France), v28 n2,3,4 1973, by Margaret Duggan Saidi, and Lunde Paul. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: \*Cotton plants, \*Pest control, \*Fungus diseases, \*Bacterial diseases, Damage assessment, Fungi, Cell wall, Penetration, Resistance, Plant genetics, Vulnerability, Cell morphology, Fungus deterioration, Developing countries, Africa, Translations, France, Books.  
Identifiers: \*Gossypium hirsutum, \*Boll Rot.

In recent years, progress in the cultivation of cotton has been very marked, thanks to the creation of productive varieties with good industrial qualities, and the use of chemical fertilizers and of the increase in the area of land protected against insects. Growers, however, remain defenseless against the damage caused by boll rot, which affects, on an average 10 to 20% of the fruit. The object of this study conducted mainly at the Central Station of the Research Institute for Cotton and Exotic Textiles at Bambari (Central African Republic) is to perfect a method of control to limit this damage. The present study proposes to define the different type of damage suffered by the fruit, to identify the organisms responsible and their mode of penetration, to define the obstacles the boll presents to the attack of parasites, and the principles of a method of control.

**PB-249 925/9** **PC-Subscription**  
New Mexico Univ., Albuquerque. Technology Application Center.  
**Solar Thermal Energy Utilization. A Bibliography with Abstracts. Semiannual Update July-December, 1974**  
Aug 75, 377p\* Rept no. TAC/ST-74/601  
See also PB-238 869.

Paper copy available on subscription at \$50.00/year domestic, \$60.00/year foreign.

Descriptors: \*Solar energy, \*Bibliographies, Solar radiation, Solar collectors, Flat plate collectors, Solar energy concentrators, Heat storage, Heat exchangers, Heat pumps, Heliostats, Solar stills, Solar ponds, Solar furnaces, Greenhouses, Solar space heating, Solar air conditioning, Solar drying, Solar dryers, Crop driers, Solar power generation, Rankine cycle, Brayton cycle, Stirling cycle, Solar sea power plants, Process heat, Thermal power plants, Solar cooking, Buildings, Abstracts.

Comprehensive coverage of the thermal uses of solar energy is presented. Topic areas cover space heating and cooling; power generation; process heat (furnace operations, distillation, cooking, crop drying); and components, including flat plate collectors, solar ponds, concentrating collectors, thermal storage, heat exchangers, coolers, heat pumps, and greenhouses. Supplementary references on material properties and availability of solar radiation are included.

**PB-249 936/6** **PC A05/MF A01**  
Mitre Corp., McLean, Va.  
**Wind Machines**  
Frank R. Eldridge. Oct 75, 85p\* MTR-6971, NSF/RA/N-75-051  
Grant NSF-AER75-12937

Descriptors: \*Windmills, \*Wind turbines, History, Systems engineering, Site surveys, Design, Performance evaluation, Cost estimates, Windpower utilization, Wind power generation, Drawings, Photographs.

This report provides a brief survey of the viability, history, taxonomy, and future potential of various types and sizes of wind machines that might be used to help meet future U.S. energy demands. It also discusses various applications of wind machines, as well as siting problems, performance characteristics, and system designs. A glossary of commonly used words and phrases, a list of suppliers, and a selected bibliography are included.

**PB-250 448/8** **PC A06/MF A01**  
Georgia Inst. of Tech., Atlanta. Economic Development Lab.  
**Discussion Papers on Problems of Science and Technology. Annual Strategy and Planning Symposium, Agency for International Development, Office of Science and Technology Held at Atlanta, Georgia on May 6-9, 1975**  
Dec 75, 122p  
Contract AID/ta-C-1194

Descriptors: \*Technology, \*Developing countries, \*Meetings, Education, Low income groups, Employment, Rural areas, Housing planning, Environments, Energy, Management methods, Food, Surveys, Reviews.

The Office of Science and Technology of the Agency for International Development periodically holds a symposium on the problems attendant to science and technology in the developing countries. The papers and group discussion summaries in this volume are the product of the third such meeting, held at the Georgia Institute of Technology, in Atlanta, Georgia. This meeting brought together a high-level multidisciplinary group of specialists from national and international agencies and institutions concerned with development policies, with the objective of reviewing past and prospective AID programs in science and technology.

**PB-250 626/9** **PC A05/MF A01**  
Eastern Associated Coal Corp., Everett, Mass. Dept. of Research and Development.  
**Development of a Non-Clogging Water Spray System**  
H. E. Harris, and R. E. Segien. 28 Nov 75, 98p  
BuMines-OFR-36-76  
Contract H0133047

Descriptors: \*Coal mining, \*Dust control, \*Sprayers, Face preparation (Mining), Spray nozzles, Plugging, Fluid filters, Mining equipment.

Causes of water spray nozzle clogging on coal mine face machines were investigated and determined. This led to the design, development, and subsequent successful field testing and demonstration of a non-clogging water spray system. The non-clogging system was installed on three different continuous-mining machines. Followup tests showed that nozzle clogging was reduced by more than 90 percent. Also, on one section respirable dust concentrations were measured before and after the two periods, there was significantly more coal mined after the system was in operation.

**PB-250 627/7** **PC A05/MF A01**  
Georgia Inst. of Tech., Atlanta. Industrial Development Div.  
**Small-Scale Industry Development in Paraguay**  
Case Study Mar 70-Jun 73  
Nelson C. Wall. Feb 74, 93p Rept no. GIT-B-414  
Contract AID/csd-3175

Descriptors: \*Industrial mobilizing, \*Paraguay, \*Regional planning, Developing countries, Investments, Urban areas, Rural areas, Organizations, Projects, Industries, Economic development, Stimulation, Exports, Networks.  
Identifiers: Small businesses.

The Industrial Development Division (IDD) of the Engineering Experiment Station at the Georgia Institute of Technology has recently completed a three-year program designed to assist the Ministry of Industry and Commerce of the Republic of Paraguay in its efforts to create a chain structure of regional development organizations, as well as to generate small-scale industries in rural-urban locations. The main objective of the project was to generate investments outside of the capital city of Asuncion and, if possible, to develop small export-oriented industries.

**PB-250 628/5** **PC A02/MF A01**  
Georgia Inst. of Tech., Atlanta. Industrial Development Div.  
**Employment Generation Through Stimulation of Small Industries. A Seven-Country Survey of Certification Licensing and Quality Marks Programs**  
Kenneth S. Stephens. Mar 75, 25p  
Contract AID/csd-3175  
See also PB-250 629.

Descriptors: \*Employment, \*Industrial relations, \*Thailand, Businesses, Manpower utilization, Developing countries, Questionnaires, Data acquisition, Industries, Stimulation, Standards, Licenses, Surveys, Project planning.  
Identifiers: Small businesses, Certification.

The survey materials consisted of a relatively simple questionnaire and a package of related materials on the certification program of Thailand, including a completed questionnaire on the current Thai program to serve as a guide. The survey requested completion of the questionnaire together with supplementary materials on the certification programs under way in responding countries. The purpose of the survey was two-fold: (1) to obtain information on certification programs which would be helpful to Thailand in its efforts to establish and further implement its own program, and (2) to assist other countries in planning or further developing their efforts by giving them a comparison of the features of certification programs in various stages of development in other countries.

**PB-250 629/3** **PC A10/MF A01**  
Georgia Inst. of Tech., Atlanta. Industrial Development Div.  
**Employment Generation Through Stimulation of Small Industries. Small-Scale Industry Development in Ecuador**  
Case History Apr 73-Dec 74  
Nelson C. Wall. Feb 75, 205p  
Contract AID/csd-3175  
See also PB-250 628.

Descriptors: \*Employment, \*Ecuador, \*Economic surveys, Businesses, Manpower utilization, Income, Production, Project planning, Stimulation, Industries.  
Identifiers: Small businesses, Artisans.



This case history represents some 18 months of research carried out by the author on site in Ecuador in an attempt to get a first hand picture of the situation. Among the findings of this study are the following: Artisan enterprises and cottage activities employ well over 200,000 persons, who, in general, manage to earn enough to provide for a precarious existence. In most cases, the artisan performs his activity to generate additional income for his family needs. These persons would be better off with an industrial job if jobs were available. Great confusion and misunderstanding exist in the interpretation of the existing laws which govern artisans and small-scale industries. There is need for a well-reasoned, logical, pragmatic action plan which will address the present situation and assure obtainable goals over the next decade.

**PB-250 848/9** **PC A16/MF A01**  
National Bureau of Standards, Washington, D.C. Center for Building Technology.  
**FY75 Progress Report on Design Criteria and Methodology for Construction of Low-Rise Buildings to Better Resist Typhoons and Hurricanes**  
Final rept. 1 Jul 74-30 Jun 75  
Richard D. Marshall, and Noel J. Raufaste, Jr.  
Nov 75, 354p\* Rept no. NBSIR-75-790  
Grant PASA-TA(CE)-04-73  
See also report dated 1 Jul 74, COM-74-11631.

Descriptors: \*Tropical cyclones, \*Houses, \*Design criteria, Construction, Construction materials, Wind tunnel models, Wind pressure, Technology transfer, Philippine Islands, Building codes, Developing countries.  
Identifiers: \*Natural disasters, \*Low rise buildings.

This report represents the major accomplishments conducted during the third phase (FY75) of a three year project to develop improved design criteria for low-rise buildings in developing countries to better resist extreme winds. The research study sponsored by the Agency for International Development commenced in March 1973. Two other reports were prepared; NBSIR 74-582 FY73 Progress Report (first phase of the research--4 months) and NBSIR 74-567 FY74 Progress Report (second phase of the research--12 months). During FY75, 6 major tasks were completed (instrumentation of fifth and sixth of six test houses to collect full scale field wind data, continuation of technician training at the field sites and at the wind tunnel facility, analyzed of extreme wind data, development of draft improved design criteria reports, participation in regional conferences in Manila and scheduling of regional dissemination of project results conference in Jamaica for November 1975). Research activities will be completed in December 1975. A final report will be published by the end of FY76.

**PB-250 966/9** **PC A10/MF A01**  
Utah State Univ., Logan. Inst. for Social Science Research on Natural Resources.  
**The Social Well-Being and Quality of Life Dimension in Water Resources Planning and Development**  
Wade H. Andrews, Rabel J. Burdge, Harold R. Capener, W. Keith Warner, and Kenneth P. Wilkinson. Jul 73, 218p OWRT-X-125(3752)(1)  
Contract DI-14-31-0001-3752  
Proceedings of the Conference of the University on Water Resources held at Logan, Utah on 10-12 Jul 73.

Descriptors: \*Water resources, \*Regional planning, \*Social effect, \*Meetings, Quality of life, Objectives, Government policies, Organizations, Management methods, Guidelines, Information systems, Project planning, Models, Rural areas, Urban areas.

Papers by academicians are reported dealing with concepts, measurements, and research findings, plus response papers from representatives of government and private organizations. Topics include the background of development of social wellbeing as a relevant value in planning and evaluation of water resources; problems in the political process in adopting social indicators and problems of organizing for needed research of a national character with thinly scattered personnel; methodology and some results in research relating to social goals; quality of life and water resources; an overview of

theoretical and conceptual issues; and finally a synthesis of these elements concerning possibilities and conditions related to dealing with social well-being as a functional account in planning and evaluating water resources development.

**PB-251 034/5** **PC A15/MF A01**  
Iowa State Univ., Ames. Dept. of Economics.  
**Management of Water Quality Through Select- ed Institutions and Instruments**  
Doctoral thesis  
Philippus Hendrik Spies. 1973, 346p OWRT-B-015-IA(5)

Descriptors: \*Water quality management, \*Rural areas, \*Skunk River Basin, Allocations, Social effect, Decision making, Cost analysis, Water rights, Sediments, Economic factors, Erosion control, Prices, Theses, Iowa.  
Identifiers: Institutional framework.

The importance and interrelationships of planning, organization-coordination, and control of water quality management are analyzed as applicable to the water quality problem in a rural area. Spillover effects on water quality management are identified and evaluated in terms of efficiency and equity, by analyzing resource allocation within market and property systems. A model was developed for maximizing social benefits subject to specific water quality restrictions and applied to the Upper Skunk River Basin in Central Iowa. An institutional framework for water quality control was developed. Water quality planning may be simplified by application of charges to point source pollutants and standards to diffused pollutants. To allow for optimal planning and allocation of water qualities over time, it may be necessary to specify rights in water qualities by tenure contracts between public and user.

**PB-251 094/9** **PC A19/MF A01**  
Volunteers in Technical Assistance, Mt. Rainier, Md.  
**Manuel Technique du Village**  
6 Feb 76, 430p  
Trans. of mono. Village Technology Handbook, 1st edition, v1, v2 1963. Text in French. Prepared in cooperation with Agency for International Development, Washington, D.C. Communications Resources Div.

Descriptors: \*Urban planning, \*Rural areas, \*Technology, \*Handbooks, Rural urban fringe, Agriculture, Sanitation, Water supply, Housing planning, Grains(Food), Vegetables, Education, Telecommunication, Construction, Translations.  
Identifiers: \*Villages.

Village-level technology and plans cover the following topics: village water supply, sanitation, agriculture, grain and produce handling and preservation, housing and construction, home improvement, and education and communication.

**PB-251 166/5** **PC A02/MF A01**  
Colorado State Univ., Fort Collins. Dept. of Civil Engineering.  
**Precipitation Management for Reclamation of Overgrazed Areas in Arid and Semi-Arid Regions**  
Completion rept.  
Neil S. Grigg. Jan 76, 13p OWRT-A-026-COLO(1)  
Contract DI-14-31-0001-5006

Descriptors: \*Mine waters, \*Spoil, \*Vegetation, \*Precipitation(Meteorology), Strip mining, Arid land, Semiarid land, Feasibility, Environmental impacts, Land reclamation, Economic development, Wildlife, Social effect, Cost analysis, Management.  
Identifiers: Revegetation, Strip mine wastes.

An investigation was made of the feasibility of using precipitation management as a method for the vegetative restoration of strip mine spoils in arid and semi-arid areas, and for the economic and environmental improvement of reclaimed mine spoils. The procedure is believed to be capable of producing vegetative systems of higher economic and wildlife habitat value than exists naturally on these same lands or might be produced by other non-irrigated methods. It would appear that the cost of the necessary R and D program would be

minimal, particularly when compared with the potential economic, environmental and social benefits which would accrue.

**PB-251 192/1** **PC A04/MF A01**  
Texas A and M Univ., College Station. Dept. of Agricultural Economics and Rural Sociology.  
**Utilization of Finfishes Caught Incidental to Shrimp Trawling in the Western Gulf of Mexico. Part II: Evaluation of Costs**  
John P. Nichols, Melvin Cross, Vito Blomo, and Wade L. Griffin. Jan 75, 51p TAMU-SG-76-203, NOAA-76020402  
Grant NOAA-04-3-158-18  
See also Part 1 dated Jun 74, COM-74-11809.

Descriptors: \*Fishing, \*Mexico Gulf, \*Marketing, Marine fishes, Value engineering, Prices, Marketing, Cost estimates, Merchant ships, Cost analysis, Shrimps.  
Identifiers: Sea Grant program, Finfishes.

The report presents estimates of the cost of operating several alternative systems for holding and landing finfish caught incidental to shrimp trawling operations. Freezer units, brine immersion tanks, an on-board fish meal plant, and extra crew member and a mother-ship concept are the systems evaluated. Break-even prices are estimated that would be necessary to cover operating costs and a 10 percent return on investment. Additionally, problems in traditional work patterns, incentives, and institutional arrangements are discussed. Comparison of estimated break-even prices with recent market prices indicate that none of the proposed systems are viable except under very restrictive conditions. The mother-ship or tender vessel concept shows the most economic potential but is plagued with problems of coordinating a large number of vessels in an industry where independence of operation is valued highly. The analytical model presented may be used to evaluate other systems not considered directly in this study.

**PB-251 291/1** **PC A08/MF A01**  
Ross Hofmann Associates, Coral Gables, Fla.  
**Evaluation of Small Modular Incinerators in Municipal Plants**  
Final rept.  
1976, 155p EPA/530/SW-113c  
Contract EPA-68-01-3171

Descriptors: \*Air pollution, \*Incinerators, \*Solid waste disposal, Monitoring, Refuse disposal, Heat recovery, Steam heating, Cost analysis, Management planning, Urban planning, Fuels, Combustion.  
Identifiers: \*Air pollution sampling.

This report describes in detail the results of monitoring three small municipal incinerators, including one that incorporates steam recovery. The three incinerators tested were all under 50 TPD design capacity per furnace and were burning typical municipal solid waste. Cost information was accumulated for each facility and, where applicable, revenue from steam sales was included. Operational, performance, and environmental analyses were performed for all units involved. This report is the latest state-of-the-art report on small incineration, should serve as a guide for municipalities considering such a system, and can be used for comparison purposes in future solid waste system evaluations.

**PB-251 377/8** **PC A10/MF A01**  
Clemson Univ., S.C. Water Resources Research Inst.  
**Multi-Objective Water Resources Planning: Methodology to Achieve Compatibility Between Environmental Amenities and Economic Development**  
Completion rept. 1 Jul 72-30 Jun 74  
David W. York, Benjamin C. III Dysart, and Lawrence W. Gahan. May 75, 224p\* WRRRI-55, W76-05840  
Prepared by Clemson Univ., N.C. Dept. of Environmental Systems Engineering.

Descriptors: \*Water resources, \*Recreation, \*Economic development, Water supply, Industries, Water consumption, Benefit cost analysis, Math-



ematical models, Optimization, Management, Mineral deposits, Manufacturing, Mining, Great Santee Swamp, South Carolina.  
Identifiers: \*Water management(Applied), \*Competing uses.

A mathematical model of multiple-use in natural areas was developed. The model represents a unified system for the evaluation of cases where traditional forms of economic development such as industrial manufacturing, suburban residential expansion, or mineral extraction are proposed for relatively natural areas having significant environmental amenity values. The model system is a unique benefit-cost analysis that allows for a rational comparison of the costs and benefits associated with both developmental and environment-related activities. The option value has been incorporated into the analysis, and methods have been devised for the estimation of desirability. The model was applied to a study of multiple-use management of the Great Santee Swamp in South Carolina.

**PB-251 382/8** PC A04/MF A01  
Economic Research Service, Washington, D.C.  
**Decentralized Tomato Processing: Plant Design, Costs, and Economic Feasibility**  
Final rept. for 1974  
E. V. Jesse, W. G. Schultz, and J. L. Bomben.  
Dec 75, 62p Rept no. USDA/AER-313

Descriptors: \*Canneries, \*Tomatoes, \*Food processing, Design criteria, Economic factors, Industrial plants, Sites, Mathematical models, Size determination, Feasibility, Decentralization(Dispersal), Cost analysis, Investments, Industrial waste treatment, Operating costs, California.

Decentralized tomato processing merits consideration as an alternative to the conventional centralized operation, which processes fresh tomatoes into a finished product in a single factory. A study was made to determine savings that would be made if the cleaning and juicing operations were done at satellite locations in rural tomato growing areas and the final processing operations completed at existing canneries. The study used typical California growing, distribution, and factory methods. Economic feasibility was evaluated for satellites processing 50 tons per hour of fresh tomatoes into a pasteurized juice; the study used a modified Stollsteimer model for determining optimal size, number of plants, and location of the processing facilities.

**PB-251 396/8** PC A21/MF A01  
Mitre Corp., McLean, Va.  
**International Symposium on Energy, Resources and the Environment (5th) Held at Kuala Lumpur, Malaysia on 17-20 February 1975**  
M. Rifkin. Dec 75, 477p Rept no. M75-84  
See also PB-219 952-SET.

Descriptors: \*Energy, \*Environmental impacts, \*Meetings, Natural gas, Petroleum, Malaysia, Indonesia, Philippines, Energy management, Energy source conservation, Energy reserves, Energy policy, Solid waste disposal, Reclamation, Economics, Agriculture, Fertilizers, Singapore, Australia, Thailand, Nuclear energy, Southeast Asia.  
Identifiers: Developing countries.

A partial listing of topic areas includes: The role of and need for technology in society; Economic development and prospects for mankind; Southeast Asia perspective; The place of energy in world peace; Dimensions of world energy; Nuclear energy infrastructure requirements; Energy scenarios for the future; Livestock and urban waste as future energy resources; Impact of energy resources on agriculture in a developing country; Energy, fertilizer and food; Resource management and international cooperation with special reference to Malaysia; National energy policy as it affects economic development.

**PB-251 471/9** PC A06/MF A01  
Carnegie-Mellon Univ., Pittsburgh, Pa. Interdisciplinary Working Party.

**Feasibility Test of an Approach and Prototype for Ultra Low Cost Housing**  
Final rept. Dec 74-Aug 75.  
Nov 75, 101p TA/OST-75-26  
Contract AID/ta-C-1174

Descriptors: \*Residential buildings, \*Socioeconomic status, \*Construction materials, Projects, Developing countries, Disasters, Rural areas, Cost analysis, Structural design.  
Identifiers: Emergency housing, Disaster prone areas, \*Low cost housing, Indigenous materials.

This report outlines the activities in a housing effort to develop a prototype ultra low-cost housing unit for use in a variety of relief and rural development situations, especially in disaster prone areas of the developing countries. The structure is an 'A' frame modular housing system which can use a wide variety of local indigenous materials in a structure which is extremely cheap, labor intensive, easily erected, and wind and flood resistant.

**PB-251 520/3** PC A04/MF A01  
National Academy of Sciences, Washington, D.C.  
**Natural Products for Sri Lanka's Future. Report of a Workshop Held at Colombo, Sri Lanka, on 2-6 June, 1975**  
1975, 61p  
Contract AID/csd-2584  
Prepared in cooperation with National Science Council of Sri Lanka, Colombo.

Descriptors: \*Economic development, \*Developing countries, \*Ceylon, \*Meetings, Natural resources, Planning, Project planning, Horticulture, Food industry, Medicinal plants, Oils, Seasonings, Drugs, Recommendations.  
Identifiers: Workshops, \*Sri Lanka, Essential oils, Spices, Underutilization, Exotic plants.

This final report is the product of a workshop jointly sponsored by the National Science Council of Sri Lanka (Ceylon) and the National Academy of Science of the U.S. The workshop's purpose was to identify scientifically sound projects that exploit natural products, that are realistic for Sri Lanka, and that can significantly contribute to the nation's economic and scientific development. This report, which has resulted from the joint deliberations of the Ceylonese and American workshop participants, presents a number of suggestions for improvement of ongoing programs, for marshalling latent resources, and for experimenting with new food and export crops. Suggestions and recommendations have resulted from the pooled knowledge and experience of all participants and are presented in several chapters that reflect the subject matter of the working sub-groups of the workshop.

**PB-251 639/1** PC A06/MF A01  
National Academy of Sciences, Washington, D.C.  
**Systems Analysis and Operations Research: A Tool for Policy and Program Planning for Developing Countries**  
1976, 107p\*  
Contract AID/csd-2584

Descriptors: \*Management engineering, \*Developing countries, \*Operations research, Economic development, Industrial engineering, Technical assistance, Theories, Operations, Definitions, Management methods, Organizations, Personnel development, Project planning, Facilities, Training, Social change, Economic factors, Technology transfer, Cybernetics, Regional planning, Policies.  
Identifiers: Discusses the possibilities of operations research and systems analysis in developing countries for advancing the economy and promoting the welfare of the people.

The report seeks answers to the questions: Do systems analysis and operations research (SA/OR) have relevance to the problems of developing countries. If so, how is an indigenous SA/OR capability developed. Accordingly the report attempts to provide an explanation of systems analysis methodology and limitations, illustrative applications of SA/OR in decision making, requirements for implementing SA/OR organization in developing countries, processes for training and criteria for producing needed personnel, and technical assistance opportunities.

**PB-251 656/5** PC A09/MF A01  
National Academy of Sciences, Washington, D.C.  
**Underexploited Tropical Plants with Promising Economic Value**  
1975, 194p  
Contract AID/csd-2584  
Attached summary in French and Spanish.

Descriptors: \*Plants(Botany), \*Developing countries, \*Tropical regions, Market value, Nutritive value, Grasses, Grain crops, Vegetables, Bean plants, Fruit crops, Oilseed crops, Forage crops, Feeding stuffs, Livestock, Root crops, Leguminous plants, Requirements.  
Identifiers: \*Underexploited plants.

The report is on plants that shows promise for improving the quality of life in tropical areas. The report aims to provide a brief introduction to the plants selected. It is neither a textbook nor a comprehensive survey of tropical botany. The report does not detail how to introduce the plants to new areas. Readers should appreciate that achieving this goal may be complex and difficult. Many plants discussed in this report have defied dissemination (or domestication) for a century or more. Plant introduction cannot be divorced from plant management; a lack of horticultural knowledge or experience will frequently cause a plant introduction to fail. Differences in elavation, soil type, temperature, day length, and rainfall present other complications. Sometimes newly introduced plants prove to be too aggressive and become weeds. Even if all these problems are overcome, the plant will be successful only if a market exists or can be created.

**PB-251 890/0** PC A02/MF A01  
Massachusetts Univ., Amherst. Water Resources Research Center.  
**The Effect of Land Use On the Chemical and Physical Quality of Surface and Ground Waters in Small Water Sheds**  
Martin E. Weeks. Sep 74, 13p Completion 74-7, Pub-41, OWRT-A-040-MASS(1)

Descriptors: \*Land use, \*Agricultural wastes, \*Water pollution, \*South River Watershed, Inorganic nitrates, Fertilizers, Inorganic phosphates, Ground water, Surface waters, Nitrification, Cattle, Water quality, Humus, Sewage, Lysimeters, Septic tanks, Massachusetts.  
Identifiers: Denitrification, Manure.

Results obtained from monitoring surface and ground waters gave only a qualified answer to the question of how to obtain some initial estimate of the effects of different land use patterns on water quality in the small watershed of South River. Agricultural wastes come largely from manure produced by the nearly 1100 head of cattle on the farms in the area, and from crop residues, and, to a lesser extent, from fertilizers used. The houses of residence, including those in Ashfield and Conway centers, contribute most of the effluents from septic tanks and considerable raw sewage directly to the South River. Eight stations were located at different places along the stream; water samples from the river at each of these stations were taken on a monthly basis for analysis. Low ground water phosphate concentrations were always found in lysimeters located in an area of the watershed where different soil management practices could be studied. No evidence of leaching was found from three field sites receiving moderate to sometimes heavy applications of manure and fertilizers.

**PB-252 583/0** PC A12/MF A01  
Jamison (Marshall), Washington, D.C.  
**Satellite Educational System Costs for Three Model Developing Countries**  
Marshall Jamison, and Stephen T. Bett. Aug 73, 271p OTP-76/004c  
Contract OTP-SE-73-208

Descriptors: \*Education, \*Radio communication, \*Television systems, Cost analysis, Instructors, Students, Learning, Programmed instruction, Developing countries.  
Identifiers: Satellite communications, Courses(Education).

The report is an investigation of the feasibility and cost-effectiveness of utilizing satellite technology



to distribute educational and medical information in three developing countries.

**PB-252 683/8** PC A20/MF A01  
National Bureau of Standards, Washington, D.C.  
Inst. for Applied Technology.  
**Wind and Seismic Effects - Proceedings of the Joint Panel Conference of the U.S.-Japan Cooperative Program in Natural Resources (6th) Held at National Bureau of Standards, Gaithersburg, Md. on May 15-17, 1974**  
Final rept.  
H. S. Lew. Apr 76, 465p\* Rept no. NBS-Special Pub 444  
Library of Congress catalog card no. 76-608055.

Descriptors: \*Structures, \*Earthquakes, \*Wind pressure, \*Meetings, Dynamic structural analysis, Design criteria, Dynamic response, Gust loads, Wind(Meteorology), Volcanism, Earthquake resistant structures, Developing countries.  
Identifiers: \*Natural hazards, \*Natural disasters, \*Earthquake engineering.

The Sixth Joint Meeting of the U.S. - Japan Panel on Wind and Seismic Effects was held in Washington, D.C., on May 15-17, 1974. The proceedings of the Joint Meeting include the opening remarks, the program, the formal resolutions, and the technical papers. The subject matter covered in the papers includes extreme winds in structural design; assessment and experimental techniques for measuring wind loads; dynamics of soil structures and ground response in earthquakes; structural response to wind and earthquakes and design criteria; disaster mitigation against natural hazards; and technological assistance to developing countries.

**PB-252 685/3** PC A06/MF A01  
Stanford Research Inst., Menlo Park, Calif.  
**Residential Hot Water Solar Energy Storage Subsystems**  
Final rept.  
Ellis E. Pickering. Jan 76, 117p\* NSF/RA/N-75/095  
Contract NSF-C905

Descriptors: \*Heat storage, \*Residential buildings, Hot water heating, Water tanks, Storage tanks, Water storage, Insulation, Solar space heating, Solar air conditioning, Corrosion prevention, Design, Construction, Cost estimates.  
Identifiers: \*Solar water heating.

Low-cost, efficient, and practical hot water solar energy storage subsystems for heating and cooling of residences are discussed. Both new and innovative vessel materials and configurations are investigated, together with insulation materials. Storage subsystem locations considered include basement, crawl-space, living space, garage, attic, surface exterior and underground exterior. Performance requirements for residential hot water storage systems are investigated. A matrix of advantages and disadvantages is constructed considering vessel material and configuration and location and type of residential construction. Other matters considered are corrosion control, costs, and development requirements.

**PB-252 854/5** PC A03/MF A01  
Transportation Research Board, Washington, D.C.  
**Concrete Admixtures**  
J. F. Young. 1976, 44p\* Rept nos. TRB/TRR-564, ISBN-0309-02474-9

Descriptors: \*Concretes, \*Cement additives, Setting time, Organic compounds, Hydration, Calcium silicates, Calcium inorganic compounds, Aluminates, High temperature tests, Porosity, Compressive properties, Alkali metal compounds, Carbonates, Sulfates.  
Identifiers: Calcium aluminates, Cement pastes, Lignosulfonates.

The papers in this Record include a review of the mechanism in which organic admixtures react with hydrating cement compounds; a discussion of the addition of water-reducing, set-retarding admixtures to concrete batches to shorten the setting time and workability time of concrete placed at high temperatures; a discussion of the influence of a water-reducing admixture on the quick setting

experienced in certain white cements that contain less than 1.6 percent SO<sub>3</sub>; and a review of the use of admixtures in the production of low-porosity cement pastes and concretes.

**PB-252 864/4** PC A06/MF A01  
TRW Systems Group, Redondo Beach, Calif.  
**Handbook for Pesticide Disposal by Common Chemical Methods**  
C. C. Shih, and D. F. Dal Porto. Dec 75, 103p\*  
EPA/530/SW-112c  
Contract EPA-68-01-2956

Descriptors: \*Solid waste disposal, \*Pesticides, \*Industrial waste treatment, Degradation, Detoxification, Hazardous materials, Chlorine organic compounds, Phosphorus organic compounds, Nitrogen organic compounds, Classification.  
Identifiers: \*Hazardous materials disposal, Liquid waste disposal.

This study is concerned with utilizing chemical degradation/detoxification methods for the disposal of small quantities of pesticide wastes. A primary objective of the study is to develop procedures to advise pesticide users of safe, readily available chemical methods for pesticide disposal. Another objective is to delineate the hazards associated with pesticide disposal by chemical methods, and warn the layman against the indiscriminate use of chemical disposal methods based on incomplete knowledge of the degradation products or the hazardous nature of the detoxifying reagents. Chemical degradation information on twenty different pesticides, representing each of the major pesticide classes, is discussed. Chemical degradation procedures that can be used by the laymen are described for naled, diazinon, Guthion, malathion, carbaryl, captan, and atrazine, but not for Dursban, methyl parathion, maneb, alachlor (Lasso), diuron, picloram, trifluralin, methoxychlor, chlordane, toxaphene, 2,4-D, amiben(chloramben), and pentachlorophenol.

**PB-253 126/7** PC A03/MF A01  
National Research Council, Washington, D.C.  
Office of Chemistry and Chemical Technology.  
**Products from Jojoba: A Promising New Crop for Arid Lands**  
Final rept. 1973-75.  
May 75, 36p\*  
Contract DHEW-OS-74-21

Descriptors: \*Shrubs, \*Arid land, \*Economic development, \*American Indians, Surveys, Distribution(Property), Byproducts, Oils, Esters, Waxes, Chemical composition, Utilization, Seeds, Chemical properties, Physical properties, Lubricants, Feeding stuffs, Waterproofing, Arizona, California.  
Identifiers: \*Jojoba plants, \*Simmondsia chinensis, Jojoba oils.

The report is on a study made by the National Research Council's Committee on Jojoba Utilization. The project was initiated at the request of the Office of Economic Opportunity (OEO). OEO asked the National Academy of Sciences for scientific and technical advice regarding the feasibility of commercial development of products from jojoba as a possible economic resource for American Indians. The report contains a general survey of what is known about jojoba, highlights gaps in the present knowledge of the plant, and lists the conclusions of the Committee, including suggestions for future actions.

**PB-253 341/2** PC A02/MF A01  
Texas Transportation Inst., College Station.  
**Preliminary Control of African Rue ('Peganum harmala' L.) with Various Herbicides**  
Research rept.  
Thomas J. Allen, Wayne G. McCully, and Garey Dean. Oct 75, 20p Rept no. TTI-2-18-74-182-1  
Prepared in cooperation with Federal Highway Administration, Washington, D.C. and Texas State Dept. of Highways and Public Transportation, Austin.

Descriptors: \*Highways, \*Weed control, \*Herbicides, Control, Maintenance, Experimental data, Tests, Ureas, Bromine organic compounds, Glycine.

Identifiers: Urea/dichloro-phenyl-dimethyl, Urea/N(dimethylethyl-thiadizolyl)-N-N-(dimethyl), Uracil/bromo-butyl-methyl, Glycine/N-(phosphonomethyl), Diuron, Bromacil, Glyphosate, Tebuthiuron.

Twenty-six herbicides used alone or in combinations were applied to African rue. The rate of application of each herbicide was determined by the recommended label rate. An exception was the rate of diuron applied, which surpasses the recommended label rate. Eight herbicides resulted in control of at least 50 percent of the African rue after a period of 7 1/2 months or longer. Tebuthiuron, Vel 5026 and diuron applied in July resulted in the highest significant control 10 1/2 months after treatment. Glyphosate, tebuthiuron, bromacil, diuron, and Vel 5026 resulted in the highest significant control of African rue with an October application 7 1/2 months following treatment.

**PB-253 369/3** PC A03/MF A01  
Environmental Protection Agency, Washington, D.C.  
**Project SAFEGUARD: Safe Pesticide Practices. Safety Handbook**  
1973, 38p  
Prepared in cooperation with Department of Agriculture, Washington, D.C.

Descriptors: \*Solid wastes, \*Pesticides, \*Safe handling, \*Hazardous materials, \*Agriculture, Accident prevention, Hazards, Mixing, Protective clothing, Storage, Signs and symptoms, Handbooks, Waste disposal, Farms.

The report is a handbook which contains 12 lessons, each dealing with basic information about pesticide safety. The material explains the basic points of pesticide safety. The handbook is designed to present, in a simplified manner, rules for pesticide use for farmers and homeowners.

**PB-253 652/2** PC A07/MF A01  
Miami Univ., Fla. Sea Grant Institutional Program.  
**Preliminary Experimentation in the Development of Natural Food Analogues for Culture of Detritivorous Shrimp**  
Steven Y. Newell, and Jack W. Fell. Jul 75, 130p  
Sea Grant Technical Bull-30, NOAA-76031605  
Grant NOAA-04-5-158-14

Descriptors: \*Shrimps, \*Feeding stuffs, \*Fungi, Wheat, Fermentation, Bagasse, Animal nutrition, Aquatic microbiology, Proteins, Food chains, Aquaculture.  
Identifiers: Sea Grant program, Penaeus duorarum, Penaeus setiferus.

A three year research program is described that has tested whether agricultural by-products can be inexpensively converted into fungal materials simulating the micro-bial-detrital complexes naturally eaten by several estuarine animals of commercial food value, including penaeid shrimp. If successful, a low-price feed could be developed to enhance commercial productivity of the shrimp. Fungal fermentations of agricultural by-products were conducted and attempts were made to optimize fungal protein production. Resultant artificial detrital feeds were tested on a proto-commercial scale in outgrowth of penaeid shrimp. Yields of shrimp ranged from very poor to encouragingly high, considering conditions imposed. Screening was begun of fungal capability to degrade the least expensive types of agricultural by-products, when these were modified to reduce lignin-associated refractoriness.

**PB-253 747/0** PC A12/MF A01  
Kentucky Univ., Lexington. Inst. for Mining and Minerals Research.  
**Social, Economic, and Environmental Impacts of Coal Gasification and Liquefaction Plants**  
Final rept.  
R. G. Edwards, A. B. Broderson, and W. P. Hauser. Apr 76, 270p\* Rept no. IMMR14-GR2-76  
Prepared in cooperation with AME Technology, Inc., Lexington, Ky. and Watkins and Associates, Inc., Lexington, Ky.

Descriptors: \*Coal gasification plants, \*Coal liquefaction plants, Manufactured gas, Synthetic fuels,



## APPROPRIATE TECHNOLOGY ABSTRACTS

Environmental impacts, Social effect, Economic impact, Air pollution, Water pollution, Noise pollution, Solid waste disposal, Industrial plants, Strip mining, Reclamation, Land use, Ecology, Erosion, Safety.

Identifiers: Occupational safety and health.

Adverse impacts of coal conversion are discussed including air, water, noise, and solid waste pollution. Also covered are occupational health and safety, land use and reclamation, and impacts on the lifestyle of rural area residents.

**PB-254 272/8** PC A02/MF A01

Environmental Protection Agency, Washington, D.C. Office of Pesticide Programs.

### Chemical Safety - Pesticides

Homer R. Wolfe. 19 Jul 74, 24p

Prepared in cooperation with Colorado State Univ., Fort Collins. Inst. of Rural Environmental Health. Proceedings of the Annual Conference of Environmental Chemicals - Human and Animal Health (3rd), Held at Fort Collins, Colorado, July 15-19, 1974.

Descriptors: \*Pesticides, \*Industrial hygiene, Hazards, Toxicology, Toxicity, Personnel, Education, Safety, Industrial atmospheres, Protective clothing, Protective coverings, Protective masks, Human factors engineering, Respirators, Exposure, Skin(Anatomy), Respiratory systems, Chemical industry.

Identifiers: \*Occupational safety and health, \*Toxic substances.

People who become involved in activities requiring exposure to pesticides should be aware of the potential hazards involved as a result of absorption of toxic compounds. If a person is knowledgeable about such hazards and understands the importance of taking proper precautions, he can do much to insure the safety of himself and others. Although illnesses resulting from over-exposure to toxic compounds do occur among applicators and other workers, most are a result of carelessness or accident. Experience has shown that if proper precautionary measures are observed and directions on the pesticide label are followed, even the more toxic compounds can be used safely. Exposure to less toxic compounds should not be ignored.

**PB-254 300/7** PC A16/MF A01

Texas Univ. at Arlington. Inst. of Urban Studies.

**Alternatives in Energy Conservation: The Use of Earth Covered Buildings. Proceedings and Notes of a Conference Held at Fort Worth, Texas on 9-12 July 1975**

F. L. Moreland. Jul 75, 352p\* NSF/RA-760006

Descriptors: \*Buildings, \*Subsurface structures, \*Meetings, Environmental engineering, Cost analysis, Psychological effects, Ordinances, Building codes, Design standards, Esthetics.

Identifiers: \*Energy conservation, \*Energy consumption, \*Earth covered buildings.

These proceedings describe the conference held at the University of Texas in Arlington on the subject of the use of earth covered buildings to provide energy efficient buildings as well as a better physical environment. The potential for energy conservation by underground construction is great because of the need for fuel conservation due to depleting resources, and an increase in fuel consumption. Topics include: Historical Perspectives; Economics; Environmental Psychology; Energy and Materials; Examples of Earth Covered Buildings; City Patterns; Political and Legal Considerations; Technical Considerations. In addition, an extensive Bibliography on earth covered buildings is presented.

**PB-254 379/1** PC A06/MF A01

Miami Valley Regional Planning Commission, Dayton, Ohio.

### A Review of Critical Factors Impacting Regional Water Quality Management

Final rept.

Mar 76, 111p Rept no. EPA-208-MVRPC-M8

Report on Areawide Waste Treatment Management Report Program. See also PB-254 378. Prepared in cooperation with Environmental Protec-

tion Agency, Washington, D.C. Div. of Water Planning, and Linton and Co., Inc., Washington, D.C.

Descriptors: \*Water resources, \*Water quality management, \*Water supply, \*Regional planning, Urban areas, Rural areas, Population growth, Employment, Land use, Solid waste disposal, Sewage treatment, Industrial waste treatment, Flood plains, Runoff, Legislation, Financing, Reviews, Ohio.

Identifiers: Miami Valley Region(Ohio), Institutional framework.

The critical factors - experience, institutional arrangement, and legal and fiscal capabilities - for water quality management, previously discussed in separate reports, are brought together to describe the existing situation in waste treatment, water supply, land use controls, solid waste, storm water, and flood plain control in the Miami Valley (Ohio) area. The information, presented in a narrative with accompanying tables and matrices, is used in the development of the Section 208 (PL 92-500) Areawide Waste Treatment Management Plan.

**PB-254 416/1** PC A06/MF A01

North Central Forest Experiment Station, St. Paul, Minn.

### Intensive Plantation Culture. Five Years Research

Forest Service General Technical rept.

May 76, 122p\* Rept no. FSGTR-NC-21

Descriptors: \*Forestry, \*Forest trees, Wood fibers, Yield, Density(Mass/volume), Plant growth, Harvesting, Plant physiology, Biomass, Nutrients, Pine trees, Fir trees, Plant diseases, Management, Economic development, Wood pulp, Viruses, Particle boards, Insects.

Identifiers: Forest plantations, \*Maximum wood yield program, \*Populus, Spruce trees.

The report reviews 5 years of progress of the Maximum Fiber Yield program. Twenty separate papers describe achievements and plans for this multiproject program.

**PB-254 469/0** PC A05/MF A01

National Bureau of Standards, Washington, D.C. Office of International Relations.

### Regional Seminar on a System of Standardization and Metrology for Latin America

Final rept.

H. Steffen Peiser, and Robert S. Marvin. Feb 76, 100p Rept no. NBSIR-76-988

Grant PRAS-TA(CE)-5-71

Descriptors: \*Metrology, \*Units of measurement, \*Latin America, \*Meetings, Standards, Standardization, Information systems, Bolivia, Brazil, Networks, Telecommunication, Ecuador, Quality control, International relations, Food, Technical assistance, Thailand, Industries, Chemical analysis, Developing countries, Personnel development, Foreign countries.

This report contains the papers presented at the first of a series of Regional Seminars, organized under the technical guidance of NBS and sponsored by the U.S. Agency for International Development and the Direccion General de Normas y Tecnologia of Bolivia. The Seminar was held at La Paz on the 24th and 25th of June, 1974, with participants from Bolivia, Brazil, Chile, Ecuador, Korea, Peru, Turkey, Thailand, and the United States of America. The Seminar was organized into four sessions, each of one half day duration, covering: Session 1, 'Interactions for Information'; Session 2, 'Interactions for Standards'; Session 3, 'Interactions for Solutions to Technical Problems'; and Session 4, 'Interaction for Training'. Portions of this document are not fully legible.

**PB-254 845/1** PC A03/MF A01

Tamil Nadu Dept. of Education, Guindy (India).

### Light Engineering Project for the Adult Blind

Final rept.

1965, 31p SRS-19-58120-001

Grant SRS-19-58120

Descriptors: \*Vocational guidance, \*Blindness, \*Rehabilitation, Adults, India, Industries, Education, Projects, Handicapped persons.

Identifiers: \*Vocational rehabilitation.

To encourage blind persons to become more independent from traditional charity and to enable them to participate in the rapid industrial development occurring in the Madras area of Tamil Nadu State, India, a 6-month rehabilitation program trained a total of 121 workers in shop and factory techniques. During the 4-year existence of the project, 51 trained clients obtained industrial jobs at salaries comparable to sighted workers. The project included workshop and 'on-the-job' training as well as training in travel and independent living skills.

**PB-255 021/8** PC A03/MF A01

Kansas Water Resources Research Inst., Manhattan.

### Swine Waste Digestion Enhancement with Nutrient Separation

Project completion rept. 1 Jul 74-30 Jun 75

Lawrence A. Schmid, and Ralph I. Lipper. Jun

76, 37p Contrib-173, OWRT-A-063-KAN(1)

Contract DI-14-31-0001-5016

Descriptors: \*Agricultural wastes, \*Digestion(Decomposition), \*Swine, \*Industrial waste treatment, Anaerobic processes, Waste water, Mixing, Separation, Ammonia, Stripping(Distillation), Removal, Carbon dioxide, Methane, pH, Anaerobic bacteria, Nutrients.

A swine waste anaerobic digester receiving the waste from 80 boars was operated for a period of ten months. Digester mixing and nutrient removal were accomplished by the recirculation of digester gases through two stripping units. Phosphoric acid was used to strip ammonia from the recirculated gas stream. Caustic solutions, primarily lime, were used to strip carbon dioxide. The removal of carbon dioxide resulted in an elevation of digester pH to 8.0. At the elevated pH ammonia was more readily stripped. A system specific ammonia desorption coefficient was determined which may be used for selecting gas flow rates. The selection of the proper gas flow rate can provide the required degree of ammonia removal to reduce ammonia concentrations to levels non-toxic to anaerobic bacteria.

**PB-255 104/2** PC A02/MF A01

Institute for Building Science, Budapest (Hungary).

### Some Aspects of the Construction of Industrial Projects in Developing Countries - Based on Hungarian Experience

Analysis of development, science organization, informatics bulletin

E. Csorba. 19 Dec 74, 15p Rept no. Bull-17

Descriptors: \*Construction, \*Technical assistance, Developing countries, Economic surveys, Economic factors, Manpower, Shortages, Hungary, Prefabrication, Reinforced concrete, Planning, Design criteria, Technology transfer.

The need of developing countries for developing the industrial construction sector and obtaining technical assistance to achieve this objective in the fastest and most effective way is a well-known fact. Though there is a big variety in the conditions of various developing countries in different parts of the world, certain common factors appear in almost all cases. Many of these factors were characteristic for Hungary in the past three decades, and it can be helpful to see what could be used from the Hungarian experience in this field.

**PB-255 137/2** PC A03/MF A01

Environmental Protection Agency, College, Alaska. Arctic Environmental Research Lab.

### Alaska Village Demonstration Projects: First Generation of Integrated Utilities for Remote Communities

Oct 73, 36p Rept no. Working Paper-22

Descriptors: \*Alaska, \*Sanitary engineering, Rural areas, Waste water, Sewage disposal, Potable water, Sewage treatment, Regional planning.

The report describes the Alaska Village Demonstration Project which was authorized by Congress in 1970 to demonstrate methods of providing safe water supplies, toilets, bathing and laundry facili-



# APPROPRIATE TECHNOLOGY ABSTRACTS

ties, sewage disposal, and other similar facilities for remote Alaskan communities.

**PB-255 444/2** PC A04/MF A01  
Dana Larson Roubal and Associates, Pierre, S. Dak.  
**Irrigation Feasibility Study - Crow Creek Tribal Farm, Crow Creek Reservation, South Dakota**  
Engineering rept. 1976.  
May 76, 55p  
Grant EDA-05-06-01566  
Prepared in cooperation with Crow Creek Sioux Tribal Council, Fort Thompson, S. Dak.

Descriptors: \*Irrigation, \*Economic development, Soil properties, Climate, Water quality, Farm crops, American Indians, Technical assistance, Feasibility, Cost estimates, Recommendations, South Dakota.  
Identifiers: Indian reservations, Sioux Indians.

The purpose of the study is to investigate and recommend whether irrigation should be used on the Tribal Farm of the Crow Creek Sioux Reservation. Geographical conditions, various proposed irrigation methods, cropping systems, and project phasing are presented for consideration. Estimated project costs are given and final recommendations made.

**PB-255 447/5** PC A10/MF A01  
Smithsonian Institution, Washington, D.C. Office of International and Environmental Programs.  
**Coastal Zone Pollution in Indonesia - A Reconnaissance Survey**  
Apr 74, 203p  
Contract AID/csd-2608

Descriptors: \*Water pollution, \*Oil pollution, \*Coasts, \*Indonesia, Developing countries, Ocean environments, Ecology, Fisheries, Estuaries, Harbors, Vulnerability, Sedimentation, Pesticides, Industrial wastes, Sewage, Dredging.  
Identifiers: \*Oil spills, Offshore drilling.

A number of catastrophic marine oil spills in the 1960's and in 1970 alerted the world to the hazards and impacts of marine oil pollution. In the same period, the emergence of other serious kinds of pollution sparked pollution control initiatives in many countries of the world. Environmental impacts associated with international development led to the undertaking of the present joint study on oil and other pollution in Indonesia's coastal waters. A survey was made of the impact of offshore oil exploitation.

**PB-255 458/2** PC A03/MF A01  
Washington Univ., St. Louis, Mo. Center for the Biology of Natural Systems.  
**Organic and Conventional Crop Production in the Corn Belt: A Comparison of Economic Performance and Energy Use for Selected Farms**  
W. Lockeretz, R. Klepper, B. Commoner, M. Gentler, and S. Fast. Jun 76, 49p\* CBNS-AE-7, NSF/RA-760084  
Grant NSF-AER-75-19031

Descriptors: \*Farm crops, \*Fertilizers, \*Pesticides, \*Agricultural economics, Grain crops, Corn plants, Output, Market value, Correlation techniques, Nutrients, Cost estimates, Manpower, Efficiency, Farms.  
Identifiers: \*Conventional farming, \*Organic farming, Energy use.

The report describes a two year study of fourteen pairs of crop-livestock farms in the Corn Belt, in which one member of each pair used only organic fertilization methods and no pesticides, while the other used conventional fertilizers and pesticides. Data are presented on the yields, production costs, and net returns of crop production on these farms for 1974 and 1975. Results also are given on the comparative energy consumption, labor intensiveness, and plant nutrient balance.

**PB-255 605/8** PC A12/MF A01  
Colorado State Univ., Fort Collins. Cooperative Extension Service.  
**Pesticide Chemicals. A Programmed Text**  
Max R. Uhlemann, Donald E. Moss, Charles O. Neidt, and Philip C. Minter. Apr 72, 261p

Descriptors: \*Pesticides, \*Agriculture, Books, History, Weed control, Herbicides, Plant diseases, Insects, Mites, Acaricides, Chlordan, Dieldrin, Livestock, Parasites, Chlorobenzenes, Questionnaires, Toxicity, DDT, Chlorohydrocarbons, Aldrin.

Contents:  
Weeds;  
Plant disease, Insects and mites of agricultural importance;  
Insecticides and miticides;  
Livestock pests.

**PB-255 649/6** PC A05/MF A01  
International Planning Management Corp., Bethesda, Md.  
**Small Business in the Metals Industry: A Background Study**  
Final rept.  
24 May 76, 88p NSF/RA-76017  
Contract NSF-Order-76-SP-0871

Descriptors: \*Mental industry, \*Businesses, \*Economic surveys, Extractive metallurgy, Technology innovation, Management planning, Marketing, Reviews, Data acquisition, District of Columbia, Government policies, Commodity management, Metaliferous ores, Mining, Beneficiation, Raw materials, Foundries, Materials recovery, Solid waste disposal.  
Identifiers: Waste recycling, High technology industries, Service companies, Secondary materials industry, Small businesses.

The objective of this study is to identify the principal small business roles in, and innovations of particular importance to, the metallurgical industry, together with associated planning and policy issues, marketing issues, and institutional arrangements. The scope of this study is confined primarily to the extraction and processing phases of the metals cycle. Extraction includes all stages prior to metal processing: mining, beneficiation of ores, reduction, smelting, and refining of the pure metals. Processing includes alloying, heat treating, rolling, casting, and fabrication. The role of small business in metals recycling and substitution is also considered but with less emphasis. The approach of the study combines literature review and letters of inquiry with personal interviews in the Washington, D.C. area. Three broad areas were identified in which small business is actively involved: high technology, service companies, and secondary recovery. A list of the individuals and institutions contacted is included in Appendix A, and a selected bibliography in Appendix B.

**PB-255 882/3** PC A18/MF A01  
Michigan Agricultural Experiment Station, East Lansing.  
**Crop Productivity - Research Imperatives, Summary of an International Conference on Crop Productivity Held on October 20-24, 1975, at the Boyne Highlands Inn, Harbor Springs, Michigan**  
A. W. A. Brown, T. C. Byerly, M. Gibbs, and S. San Pietro. 1976, 409p\* NSF/RA-760176  
See also PB-255 881. Prepared in cooperation with Charles F. Kettering Research Lab., Yellow Springs, Colo. Sponsored in part by Energy Research and Development Administration, Washington, D.C., and Department of Agriculture, Washington, D.C.

Descriptors: \*Food supply, \*Farm crops, \*Meetings, Production, Agricultural economics, Manpower, Plant genetics, Nitrogen fixation, Pest control, Nutrition, Nitrogen, Carbon, Plant reproduction, Proteins, Microclimatology, Protection, Plant diseases, Soil water, Photosynthesis, Fertilizers.

An exploding population and an increasingly affluent society impose a more acute challenge to agriculture than ever before. The proceedings of this international conference reveal a concern for the continued adequacy of our food supply. The focus is on the fundamental biological processes that control productivity of economically important food crops. The proceedings continue with the discussions by four speakers on: 'World Productivity: Challenges to Science', 'Rice Responds to Science', 'Agricultural Productivity and World Nutrition', and 'Shooting At A Moving Target'. The conference work is conducted by six working groups.

They address issues involving: Nitrogen Input; Carbon Input; Water, Soil, and Mineral Input; Plant Protection From Pests; Environmental Stress; and Plant Development Processes.

**PB-255 911/0** PC A05/MF A01  
Transportation Research Board, Washington, D.C.  
**Transportation and Land Use Planning Abroad**  
Special rept.  
Floyd I. Thiel, Teruki Kitamura, Yasumasa Torii, Allan K. Sloan, and Daniel L'Huilier. 1976, 83p\*  
Rept nos. TRB/SR-168, ISBN-0-309-02487-0

Descriptors: \*Transportation, \*Land use, \*Foreign countries, Noise reduction, Noise pollution, Financing, Public opinion, Pedestrians, Highway transportation, Urban transportation, Cargo transportation, Japan, Canada, Europe, Middle East, Developing countries, Metropolitan areas.

The papers discuss some of the ways that transportation and land use planning abroad is providing experience that can be helpful in the United States. Geographic areas from which experience is drawn include Japan, Canada, Europe, and the Middle East. Topics include noise and other transportation impacts, land use techniques to deal with these impacts, transit financing, public participation, 'pedestrianization' in various countries, pricing to restrain parking, truck regulation, highway needs in Canada, and transportation sensitivity considerations in developing countries.

**PB-255 928/4** PC A03/MF A01  
Maryland Univ., College Park. Agricultural Experiment Station.  
**Solar Energy Applications in Agriculture: Potential, Research Needs, and Adoption Strategies, Summary and Recommendations**  
F. E. Bender, A. M. Cowan, and R. W. Dillon. Jan 76, 39p Bull-A-185, NSF/RA-760020  
Grant NSF-PTP75-10573  
Sponsored in part by Agricultural Research Service, Washington, D.C.

Descriptors: Agriculture, Solar heating, Solar drying, Solar space heating, Irrigation, Farm crops, Farm buildings, Greenhouses, Energy consumption, Economic analysis, Recommendations.  
Identifiers: Heat consumption.

This report briefly discusses solar applications in: Corn and rice grain drying; Curing of tobacco and peanuts; Heating of animal shelters; Heating of greenhouses and rural, especially on-farm, residences; and, Irrigation.

**PB-255 980/5** PC A11/MF A01  
Social Action Research Center, Berkeley, Calif.  
**Program Development: A Manual for Organizational Self-Study**  
Judith Blanton, and Sam Alley. Aug 75, 230p  
ADAMA-72-4  
Contract PHS-HSM-42-72-143

Descriptors: \*Organizations, \*Management engineering, \*Project planning, \*Manuals, Sequencing, Methodology, Human factors engineering, Services, Models, Development, Cycles, Feedback, Adaptive systems, Objectives, Organization theory, Personnel management, Purchasing, Scheduling, Revisions, Decision making.  
Identifiers: Self study.

This manual was designed for organizations interested in self-development--in improving their planning, their use of resources, and learning from their successes and problems. It provides an example of a kind of situation one might face in attempting to implement that portion of the cycle and allows one to test his knowledge of the ideas presented in each chapter of the manual.

**PB-256 025/8** PC A08/MF A01  
National Research Council, Washington, D.C.  
**Maternal and Child Health Research**  
Final rept. 1970-75.  
1976, 165p\*  
Contract N01-HD-5-2818

Descriptors: \*Infant health care, \*Child health care, Pediatrics, Children, Research, Humans, Em-



## APPROPRIATE TECHNOLOGY ABSTRACTS

bryos, Pregnancy, Grants, Reproduction(Biology), Funding, Health manpower, Health manpower education, Psychology, Sociology, Recommendations, Tables(Data).  
Identifiers: \*Maternal and child health care programs, Appendices.

The report identifies a number of 'correctable deficiencies' in the U.S. research and training efforts and calls upon NICHD to assume 'lead agency' responsibility for initiating and supporting the needed programs and changes to benefit the health of mothers and children, either directly or indirectly, by increasing fundamental knowledge necessary for that goal.

**PB-256 064/7** PC A10/MF A01  
Massachusetts Inst. of Tech., Cambridge.  
**The Implications for American Foreign Policy of Low-Cost Non-Voice Communications. A Report to the Department of State**  
Ithiel de Sola Pool, and Arthur B. Corte. Oct 75, 209p\*  
Also available in set of 3 reports as PB-256 063-SET, PC E99/MF E99.

Descriptors: \*Telecommunication, \*Foreign policy, \*Data transmission, International relations, Computer networks, Communication satellites, Radio relay systems, Teletypewriter systems, Cost factors.  
Identifiers: Packet switching, Low costs, Teleconferencing.

The paper is about the possible effects on international relations of certain new technologies of communication, specifically: data communication via computer networks, packet switching and satellites. Technology exists today that would, if used, reduce the cost of global teletypewriter communication to levels approximately like the present costs of the mails or of local telephoning. Such low cost, high speed, long distance communication facilities would if implemented profoundly modify patterns of international interaction in business, science, culture, and government. The report attempts to outline, for the benefit of that Department, some facts regarding the technology of low cost transmission of text, and their implications. It also outlines policy alternatives that the Department should consider.

**PB-256 065/4** PC A13/MF A01  
Massachusetts Inst. of Tech., Cambridge.  
**Implications of Low-Cost International Non-Voice Communications. Volume 2. A Report to the Department of Commerce and the Office of Telecommunications Policy**  
Ithiel de Sola Pool, and Arthur B. Corte. Sep 75, 290p\*  
Also available in set of 3 reports as PB-256 063-SET, PC E99/MF E99.

Descriptors: \*Telecommunication, \*Foreign policy, \*Data transmission, International relations, Computer networks, Communication satellites, Radio relay systems, Teletypewriter systems, Utilization, Cost factors.

Contents:  
Record communication--a historical view;  
Growth of international data traffic;  
Present status of international data communication;  
New technologies;  
New services;  
Prerequisites for the new services;  
Structure of the international record carrier industry.

**PB-256 066/2** PC A06/MF A01  
Massachusetts Inst. of Tech., Cambridge.  
**Implications of Low-Cost International Non-Voice Communications. Volume 3. A Report to the Department of Commerce and the Office of Telecommunications Policy. Appendices**  
Ithiel de Sola Pool, and Arthur B. Corte. Sep 75, 104p\*  
Also available in set of 3 reports as PB-256 063-SET, PC E99/MF E99.

Descriptors: \*Telecommunication, \*Foreign policy, \*Data transmission, International relations, Infor-

mation services, Postal service, Communications management, Communication satellites, Radio relay systems, Frequency allocations, Cost factors.  
Identifiers: Spectrum management, Data bases.

Contents:  
Existing data bases;  
Glossary;  
A model for an electronic postal system;  
The grand negotiations--politics, satellites, and decision-making in the international telecommunications union;  
The US international record communication industry.

**PB-256 067/0** PC A07/MF A01  
Massachusetts Inst. of Tech., Cambridge.  
**Low Cost Data and Text Communication for the Less Developed Countries. A Study with Special Reference to the Needs of The International Agricultural Research Centers**  
Ithiel de Sola Pool, Elliot Freedman, and Colin Warren. Jan 76, 150p\*

Descriptors: \*Telecommunication, \*Developing countries, Agriculture, Data transmission, Cost benefit analysis, Technical assistance, Technology transfer, Cost factors.  
Identifiers: Low costs.

High technology systems of data communication including facsimile, computer polling systems, packet switching, and multiple access satellite systems are manageable in, and appropriate to the needs of the less developed countries. Use of such technologies can (1) markedly reduce costs for some important services, (2) locate activities in those centers where adequate maintenance and technical personnel exists, and (3) give the LDC's access to the best and most advanced technical information bases.

**PB-256 103/3** PC A02  
Rhode Island Univ., Kingston. Dept. of Resource Economics.  
**Optimizing the Growth and Marketing of Fish in a Controlled Environment**  
J. M. Gates, and J. J. Mueller. Jun 75, 7p Marine Reprint-52, NOAA-76050601  
Grant NOAA-04-3-158-3, NOAA-04-5-158-6  
Pub. in MTS Jnl., v9 n5 p13-16 Jun 75. Also pub. as Rhode Island Agricultural Experiment Station, Contrib-1611.

Descriptors: \*Fisheries, \*Aquaculture, \*Economic development, Marine fishes, Fishes, Marketing, Prices, Salmon, Growth, Sales, Optimization, Pumping, Feasibility, Heating, Operating costs, Mathematical models, Temperature, Controlled atmospheres, Linear programming, Tables(Data).  
Identifiers: Reprints, Sea Grant program.

The report assesses the economic feasibility of optimizing the growth and marketing of fish in a controlled environment. This report presents a linear programming model in which processes are included for sales, growth, water pumping, and recruitment.

**PB-256 128/0** PC A06/MF A01  
Development Planning and Research Associates, Inc., Manhattan, Kans.  
**Feasibility Study of a Fish Processing Plant at Kotzebue, Alaska**  
Technical assistance rept.  
Jun 75, 102p EDA-76-025  
Contract C-4-36315

Descriptors: \*Food processing, \*Fishes, \*Economic development, Salmon, Marine fishes, Technical assistance, Feasibility, Economic impact, Market research, Alaska, Cash flow.  
Identifiers: Kotzebue(Alaska), Fish processing.

The purpose of the report was to evaluate the economic and technical feasibility of replacing the present fish processing plant with a new facility at Kotzebue, Alaska. In the past three years, the Cooperative had to consider replacing the plant which was deteriorating. The economic impact of a new processing plant would be significant, therefore creating more jobs and an increased cash flow.

**PB-256 406/0** PC A04/MF A01  
United Indian Tribe of Western Oklahoma and Kansas.  
**Hog Bristle Processing By-Products and Paint Brush Manufacturing. A Feasibility Report**  
1976, 67p EDA-76-022  
Grant EDA-08-601573-1  
Prepared by General Research Corp., Oklahoma City, Okla.

Descriptors: \*Economic development, \*Technical assistance, \*Manufacturing, \*Brushes, Paint applicators, Bristles, Marketing, Product development, Revenue, Profits, Operating expenses, Oklahoma, Kansas.  
Identifiers: Hog bristles.

The report investigates the potential for the manufacture of natural bristle paint brushes and the potential for marketing bristle byproducts. The report also examines both the purchases of bristle on the open market and the use of bristle supplied by processing operations.

**PB-256 460/7** PC A03/MF A01  
Environmental Protection Agency, Washington, D.C. Resource Recovery Div.  
**Resource Recovery Plant Implementation: Guides for Municipal Officials: Further Assistance**  
1975, 34p Rept no. EPA-SW-157.8

Descriptors: \*Economic development, \*Urban planning, \*Materials recovery, Resources, Project planning, Industrial plants, States(United States), Community development, Systems engineering, Organizations, Economic assistance, Manuals, Technology innovation, Reclamation, Municipalities, Solid waste disposal.  
Identifiers: Solid waste management.

This publication is part of a special series of reports prepared by the U.S. Environmental Protection Agency's office of solid waste management programs. These reports are designed to assist municipal officials in the planning and implementation of processing plants to recover resources from mixed municipal solid waste. It deals with planning and management.

**PB-256 461/5** PC A02/MF A01  
Environmental Protection Agency, Washington, D.C. Resource Recovery Div.  
**Resource Recovery Plant Implementation: Guides for Municipal Officials: Financing**  
1975, 25p Rept no. EPA-157.4

Descriptors: \*Economic development, \*Materials recovery, \*Financing, Management planning, Decision making, Cost engineering, Capital, Solid waste disposal, Reclamation, Urban planning, Marketing, State government, Local government, National government, Government policies.  
Identifiers: Solid waste management.

This publication is part of a special series of reports designed to assist municipal officials in the planning and implementation of processing plants to recover resources from mixed municipal solid waste. It deals with financing, decision making, cost engineering, and capital formation.

**PB-256 748/5** PC A02  
Louisiana State Univ., Baton Rouge.  
**Agricultural By-Products as Supplemental Feed for Crawfish**  
Jonathan C. Goyert, James W. Avault, Jr, James E. Rutledge, and Teme P. Hernandez. 1976, 17p LSU-R-76-002, NOAA-76042105  
Pub. in Louisiana Agriculture, v19 n2 p10-11 Winter 1975-76.

Descriptors: \*Feeding stuffs, \*Diets, \*Crayfishes, Farm crops, Byproducts, Food processing, Animal nutrition, Tables(Data).  
Identifiers: Reprints, Sea Grant program.

In the article is discussed the research that is being conducted to develop a diet for crawfish. The diet for this species would consist of agricultural byproducts. A series of repeated experimental feedings have been conducted of which the results are included in tables.



# APPROPRIATE TECHNOLOGY ABSTRACTS

**PB-256 771/7** PC A03/MF A01  
Bangladesh Univ. of Engineering and Technology,  
Dacca. Dept. of Civil Engineering.  
**Low-Rise Low-Cost Housing and Extreme  
Wind Related Problems in Bangladesh**  
Rept. no. 2  
Jamilur R. Choudhury. Apr 75, 40p NBS-GCR-76-  
74  
Contract NBS-4-35770

Descriptors: \*Housing planning, \*Bangladesh,  
Residential buildings, Socioeconomic status,  
Urban areas, Rural areas, Surveys, Requirements,  
Wind(Meteorology), Damage, Records, Foreign  
countries.  
Identifiers: Wind damage, Low cost housing, Low  
rise buildings.

This report furnishes information on socio-economic factors, the present conditions of urban and rural housing, and housing needs in Bangladesh for the next ten years. It also provides data on available wind speed records and wind damage statistics and discusses some special problems unique to Bangladesh.

**PB-256 827/7** PC A06/MF A01  
Southern Illinois Univ., Carbondale. Fisheries Research Lab.  
**Use of Zooplanktophagic Fishes in Channel  
Catfish Production Ponds**  
Completion rept. 16 Dec 74-15 Dec 75  
William M. Lewis. Apr 76, 101p NOAA-76051206

Descriptors: \*Catfishes, \*Aquaculture, Ponds,  
Zooplankton, Oxygen, Monitoring, Feeding stuffs,  
Abundance, Temperature, Biochemical oxygen  
demand, Depletion, Fresh water fishes.  
Identifiers: \*Ictalurus punctatus, Lepomis macrochirus, Ctenopharyngodon.

On basis of a report in the literature, and a previous study, it was postulated that unusually high populations of zooplankters might trigger oxygen depletion in catfish production ponds. To investigate this hypothesis, six ponds were stocked with fingerling channel catfish at a rate of 74, 130 fish/ha. The hybrid sunfish were added as zooplanktophagic fish on the supposition that they would prevent the development of a dense population of zooplankton and the effect of this could be measured by chemical monitoring. The hybrid sunfish appeared to have caused a change in the composition of the zooplankton, but their presence did not prevent oxygen from reaching critical levels. There is some evidence that they did affect the oxygen regime of the ponds, although not necessarily favorably. The most valuable observation resulting from the study related to oxygen production-consumption analyses based on sunrise-sunset readings. In general, it appeared impractical to stabilize oxygen in catfish production ponds without resorting to artificial oxygenation at selected times.

**PB-257 066/1** PC A06/MF A01  
National Academy of Sciences, Washington, D.C.  
Board on Science and Technology for International Development.  
**Science and Technology Policy, Research  
Management and Planning in the Arab Republic  
of Egypt**  
1976, 106p  
Contract AID/csd-2584  
Report of a Symposium on Science Policy Planning, Held at the National Research Centre, Cairo, April 30-May 1, 1975, and Workshop on the Management and Planning of Research, Held at the National Academy of Scientific Research and Technology, Cairo Egypt, May 3-8, 1975. Prepared in cooperation with Academy of Scientific Research and Technology, Cairo (Egypt).

Descriptors: \*Technology transfer, \*Meetings, Research management, Education, Manpower, Agreements, Cooperation, Universities, Egypt, United States.

In 1974, discussions among Egyptian and Americans on the role of science and technology in national development planning were begun both at governmental and private levels. Visits to the Arab Republic of Egypt (ARE) by members of the U.S. National Academy of Sciences and, independently, the creation of an intergovernmental U.S.-Egypt-

tian Joint Working Group on Technology, Research, and Development, resulted in a decision to convene a conference on the management of scientific and technological research. The conference was to focus on science and technology policy, planning, and research management; a 'workshop' format was chosen as the best method to bring together a representative group of Egyptian and American physical, natural, and social scientists, economists, engineers, and development planners. The two-day symposium provided ample opportunity to contrast science and technology organization and planning in Egypt and the United States to trace the influences of national scientific and technological policies and programs on economic development, and to examine relationships between university teaching and research and national economic growth.

**PB-257 357/4** PC A13/MF A01  
National Research Council, Washington, D.C.  
Committee on Renewable Resources for Industrial Materials.  
**Renewable Resources for Industrial Materials**  
James S. Bethel. Sep 76, 280p\* NSF/PRA-1  
Contract NSF-STP75-01069

Descriptors: \*Natural resources, \*Forestry, \*Agriculture, \*Energy conservation, Wood products, Farm crops, Cotton plants, Soybean plants, Elastomers, Leather, Hides, Algae, Fishes, Solid wastes, Refuse, Biomass, Textiles, Paper products, Paperboards, Farm management, Production management, Supply management, Energy management, Substitution.  
Identifiers: Renewable resources, Fuel substitution.

The concept of the Reference Materials System (RMS) is used as a framework for material assessment and, more specifically, to address the substitution of renewable materials for nonrenewables in particular end uses. The orderly and rational development of national goals for renewable resources requires the evaluation of alternative materials supply systems in terms of resource supply; available technology; and energy, manpower, and capital requirements.

**PB-257 358/2** PC A04/MF A01  
New York State Coll. of Agriculture and Life Sciences, Ithaca.  
**Potential Increases in Food Supply Through  
Research in Agriculture. Constraints on Increasing  
Agricultural Production in the Tropics. Research  
and Implementation Needs**  
Final rept.  
Edwin B. Oyer, Charles E. Hanrahan, Glenn H. Beck, J. Ritchie Cowan, and H. David Thurston.  
31 May 76, 57p\* NSF/PRA-4  
Contract NSF-STP75-13988

Descriptors: \*Agriculture, \*Tropical regions, \*Food supply, \*Research projects, Universities, Farms, Technology transfer, Soils, Natural resources, Plant growth, Inventories, Constraints, Water supply, Fertilizers, Seeds, Pesticides, Feeding stuffs, Animal diseases, Production.  
Identifiers: Tropical agriculture.

The report centers on researchable constraints which can be addressed immediately and, with reasonable inputs, be expected to produce production-increasing results in 5-10 yrs. Enhancement of prospects for technological innovation employing a described global network of agricultural research institutions is suggested. Techniques which will foster farmer-researcher participation in planned and structured research on farming systems of the tropics are called for as a means of increasing food production. Enhancement of efforts in the following areas are recommended: (1) evaluation and utilization of available germplasm in cropping systems, (2) inventory of soil resources and determination of amendments needed to produce adapted plants, (3) improvement of water and pest management practices and seed technology, and (4) utilization of ruminant animals in farming systems with attention to feed supplies, protection from diseases and increased productivity of the animals.

**PB-257 362/4** PC A06/MF A01  
New York State Coll. of Agriculture and Life Sciences, Ithaca.  
**Potential Increases in Food Supply Through  
Research in Agriculture. Increased Productivity  
from Animal Agriculture**  
Final rept. 1 Jun 75-31 May 76  
N. L. VanDemark. Jun 76, 108p NSF/PRA-3  
Contract NSF-STP75-13987

Descriptors: \*Livestock, \*Animal husbandry, \*Food supply, Research projects, Feeding stuffs, Animal nutrition, Range grasses, Grains(Food), Production, Quality, Fossil fuels, Output, Mathematical models, Systems analysis.

There is a need for continuing emphasis on animal research since animal products contribute about half the nutrients in the US diet. Two-thirds of the feed energy used in producing these products come from inedible substances. Animal agriculture utilizes large acreages of range and other land unsuitable for crops for human consumption and uses huge tonnages of by-products and wastes that could be troublesome environmental pollutants. Excess food grains can be used when they are not needed for human consumption. Research is needed to (1) optimize the number of productive animal units, (2) increase food output per animal unit, (3) develop low fossil-energy subsidy methods of livestock production, (4) develop new feed resources, (5) improve animal product quality, and (6) evaluate animal production and biological systems by simulation modelling and systems analysis.

**PB-257 404/4** PC A05/MF A01  
Connecticut Resources Recovery Authority, Hartford.  
**Front End Recycling: A Study of the Economics  
of Recycling by Source Separation and Its  
Application for Fairfield County, Connecticut**  
Ronald Fattibene, and Irving Moy. Jun 76, 94p  
EDA-76-043  
Prepared by Action for Bridgeport Community Development, Inc., Bridgeport, Conn.

Descriptors: \*Solid waste disposal, \*Materials recovery, \*Separation, Management planning, Feasibility, Economic analysis, Glass, Cans, Tin coatings, Steels, Metal scrap, Aluminum, Newsprint, Questionnaires, Personnel, Connecticut.  
Identifiers: \*Waste recycling, Secondary materials industry.

A one-year grant from the EDA to the Connecticut Resources Recovery Authority was allocated to the CRRRA to examine the economics of recycling by source separation in Fairfield County. The purposes of the project was to assess the feasibility of a technology system for recycling by source separation and to determine the practicability of instituting such a system and the resulting economic impact of such an enterprise in Fairfield County. Factors to be explored in the course of the study were creation of new jobs, new business, cost benefits from the sale of recycled materials, and cost savings to communities. Conclusions and recommendations reflect the system as it existed at this writing.

**PB-257 454/9** PC A05/MF A01  
Environmental Protection Agency, Washington, D.C. Municipal Construction Div.  
**Land Application of Wastewater in Australia.  
The Werribee Farm System, Melbourne, Victoria**  
Technical rept.  
Belford L. Seabrook. May 75, 88p Rept nos.  
EPA/430/9-75/017, EPA/MCD-16

Descriptors: \*Sewage treatment, \*Irrigation, \*Farms, \*Municipalities, Soil properties, Land use, Rainfall, Arid land, Operating costs, Fertilizing, Waste water, Australia.  
Identifiers: \*Flood irrigation, \*Sewage irrigation, Werribee Farm, Melbourne(Australia).

The report concerns the Werribee Farm soil treatment area operated by the Melbourne and Metropolitan Board of Works (MMBW). The Board (MMBW) was constituted in 1890 by an Act of the Parliament of Victoria to develop and operate a system of main and general sewerage for the me-



tropolis. James Mansergh, an eminent sanitation engineer from London, submitted eight alternative schemes, five of which involved treatment by land. Mansergh stated that the Werribee site was situated for land purification of sewage because it was exceptionally dry and had an abnormally low rainfall compared with surrounding districts. His recommendation, based on proven success in England, and on the benefit of irrigation in an area of low rainfall, was for disposal by flood irrigation on prepared land without prior treatment of the sewage. Even today raw sewage is used at the Werribee Farm. The Werribee Farm soil treatment system is the outstanding project in Australia from the standpoints of the lowest annual operating costs, success, size and extent of experience with the use of wastewater effluents.

**PB-257 560/3** **PC A04/MF A01**  
Arizona Univ., Tucson. Office of Arid Lands Studies.

## **Continuation of the Arizona Water Information System (AWIS)**

Technical completion rept.  
K. E. Foster, and K. J. DeCook. 1975, 55p  
OWRT-A-031-ARIZ(2)  
Contract DI-14-31-0001-5003  
Prepared in cooperation with Arizona Water Resources Research Center.

Descriptors: \*Water resources, \*Information retrieval, \*Data processing, \*Information systems, Hydrologic cycle, Ground water, Water quality, Systems analysis, Water supply, Data storage, Project planning, Abstracts, Regional planning, Colorado River Basin, Arizona, California, Nevada.  
Identifiers: Hydrologic data.

The Arizona Water Information System (AWIS) was developed for storage and retrieval of water resources data and for dissemination of water resources information pertaining to the state of Ariz. Collectively, the AWIS system contains a number of distinct elements. The Activity File is a listing of water resource activities and projects dating from 1961, which can be accessed by keywords or by agency to retrieve abstracts and information on approximately 1,000 projects; the file recently was updated and additional projects covered in a regional program pertaining to the Lower Colo. River Basin portions of Ariz., Calif., and Nev.

**PB-257 649/4** **PC A03/MF A01**  
Environmental Protection Agency, Washington, D.C. Municipal Construction Div.  
**Model Facility Plan for a Small Community, Supplement to: Guidance for Preparing a Facility Plan, Municipal Wastewater Treatment Works Construction Grants Program**  
Sep 75, 45p Rept no. EPA/MCD-08

Descriptors: \*Sewage treatment, \*Municipalities, \*Project planning, \*Facilities, \*Construction, Models, Grants, Federal assistance programs, Handbooks, Guidelines, Public utilities.  
Identifiers: Hypothetical communities, Application making, Federal Water Pollution Control Act Amendments of 1972.

Under the Federal Water Pollution Control Act Amendments of 1972, a municipality must prepare a facility plan as part of its Step 2 grant application for the construction of a wastewater treatment works. This model plan for a fictitious small, rural community supplements the Guidance for Preparing a Facility Plan, published in May 1975. The plan is provided for illustrative purposes only and should not be read as an ironclad guide to facility planning for small, rural communities.

**PB-257 724/5** **PC A03/MF A01**  
Department of Agriculture Extension Service, Washington, D.C.  
**Apply Pesticides Correctly. A Guide for Private Applicators**  
1975, 27p  
Prepared in cooperation with Environmental Protection Agency, Washington, D.C. Pesticide Operations Div.

Descriptors: \*Pesticides, \*Manuals, Pest control, Spraying, Dusting, Insects, Weed control, Insecticides, Plant diseases, Safety, Calibrating, Equip-

ment, Law(Jurisprudence), Regulations, Marking, Residues, Utilization.

Contents:  
Pests;  
Pest control;  
Pesticides;  
Labels and labeling;  
Using pesticides safely;  
Application equipment;  
Laws and regulations. Color illustrations reproduced in black and white.

**PB-257 801/1** **PC A05/MF A01**  
Environmental Protection Agency, Washington, D.C. Office of Solid Waste Management Programs.  
**Improving Rural Solid Waste Management Practices**  
Theodore L. Goldberg. 1973, 91p Rept no. EPA-SW-107

Descriptors: \*Solid waste disposal, \*Rural areas, \*Management methods, Technology, Improvement, Recommendations, Effectiveness, Environmental surveys, Collecting methods, Processing, Storage, Organizing, Objectives, Transferring, Sanitary landfills, Equipment, Financing, Citizen participation.  
Identifiers: Household wastes.

This report surveys what has been done and can be done to raise the quality of solid waste management in rural America through existing technology. The aspects covered include planning for solid waste management; types of collection, processing, and disposal methods; means of financing systems; and citizen support. Although the priority in the report deals with handling wastes from rural residences, any methods discussed can be incorporated into handling commercial, industrial, or institutional wastes in rural counties and communities. Two problem wastes--agricultural wastes and abandoned vehicles--are not covered.

**PB-258 003/3** **PC E02/MF A01**  
Illinois Univ. at Chicago Circle. Dept. of Materials Engineering.  
**Cracking and Leakage Characteristics of Ferrocement Water Tanks**  
Interim rept.  
Antonio J. Guerra, Antoine E. Naaman, and Surendra P. Shah. Sep 76, 62 Rept no. 76-3  
Contract NSF-ENG74-20829

Descriptors: \*Water tanks, Mortars(Material), Portland cements, Reinforcing materials, Wire cloth, Cracking(Fracturing), Leakage, Cost comparison, Cylindrical bodies, Structural analysis.  
Identifiers: \*Ferrocement.

Cylindrical ferrocement tanks were subjected to increasing internal water pressures to study the influence of the reinforcing parameters on their cracking and leakage behavior. Based on the information generated in this investigation, allowable tensile stresses of about 30,000 psi in the steel are recommended for the design of virtually watertight ferrocement tanks. This allowable stress - which is almost twice higher than that recommended by the ACI Committee on reinforced concrete sanitary engineering structures - is used in a cost comparison study of water tanks made with ferrocement, reinforced concrete and steel. It is found that for current U.S. prices, properly dimensioned and designed ferrocement water tanks of up to 300,000 gallon capacity are cost competitive with reinforced concrete and steel tanks and would have at least equal performance.

**PB-258 068/6** **PC A03/MF A01**  
Environmental Protection Agency, Washington, D.C. Div. of Water Planning.  
**Implementing 'Best Management Practices' for Residuals: The Waste Exchange**  
Alan K. Vitberg, Michael L. Rucker, and Christopher H. Porter. Jun 76, 31p Rept no. EPA/440/9-76/019

Descriptors: \*Materials recovery, \*Benefit cost analysis, \*Utilization, Exchanging, Economic development, Residues, Solid waste disposal, Technology, Salvage, Water pollution abatement, Incentives, Industrial wastes.

Identifiers: State planning.

This document presents an overview of a mechanism which can be used to facilitate the exchange of wastes, as is, from a generator to a user and its possible role in state and areawide residuals planning efforts. The premise is that many wastes contain valuable materials, some of which are in short supply. Extraction of materials from these wastes makes sense from both the conservation and the environmental points of view. Industry can dispose of its unwanted wastes and perhaps receive a monetary bonus. The waste receiver can potentially reduce costs for materials. In addition, the environment is saved from the introduction of potential pollutants from land and water disposal methods.

**PB-258 402/7** **PC A08/MF A01**  
Environmental Protection Agency, Washington, D.C. Office of Water Programs.  
**Manual of Individual Water Supply Systems**  
1975, 160p Rept no. EPA/430/9-74/007  
See also PB-215 815, and PB-258 403.

Descriptors: \*Water supply, \*Water distribution, \*Water consumption, Manuals, Ground water, Sources, Surface waters, Rural areas, Water storage, Pumping, Water wells, Bacteria, Water quality, Disinfection, Ordinances.  
Identifiers: \*Water quality data.

Contents:  
Selection of a water source;  
Ground water;  
Surface water for rural use;  
Water treatment;  
Pumping, distribution, and storage.

**PB-258 403/5** **PC A08/MF A01**  
Environmental Protection Agency, Washington, D.C. Office of Water Programs.  
**Manual of Individual Water Supply Systems**  
1973, 159p Rept no. EPA/430/9-73/003  
See also PB-215 815, and PB-258 402.

Descriptors: \*Water supply, \*Water distribution, \*Water consumption, Manuals, Sources, Ground water, Surface waters, Rural areas, Water storage, Pumping, Water treatment, Water wells, Bacteria, Water quality, Disinfection, Ordinances.  
Identifiers: \*Water quality data.

Contents:  
Selection of a water source;  
Ground water;  
Surface water for rural use;  
Water treatment;  
Pumping, distribution, and storage.

**PB-258 499/3** **PC A05/MF A01**  
Ebon Research Systems, Silver Springs, Md.  
**Fuel and Energy Production by Bioconversion of Waste Materials - State-of-the-Art**  
Silvia A. Ware. Aug 76, 78p\* EPA/600/2-76/148  
Contract EPA-68-03-0295

Descriptors: \*Synthetic fuels, \*Solid waste disposal, \*Energy sources, \*Reclamation, Refuse, Organic wastes, Agricultural wastes, Wood wastes, Solid wastes, Biomass, Fertilizers, Wastes, Cellulose, Methane, Ethyl alcohol, Ethanol, Methyl alcohol, Fuel oils, Char, Anaerobic processes, Hydrolysis, Fermentation, Digestion(Decomposition), Cost estimates, Technology, Reviewing.  
Identifiers: Manure, Animal wastes, \*Refused derived fuels.

This report is a state-of-the-art summary of biological processes for converting waste cellulosic materials (agricultural, municipal and lumbering wastes) to fuels. It indicates the locations and quantities of suitable wastes and discusses the status of the current processing schemes. The processes discussed are: Acid hydrolysis followed by fermentation; enzyme hydrolysis followed by fermentation; anaerobic digestion of manure and municipal solid waste; and, biophotolysis.

**PB-258 742/6** **PC A08/MF A01**  
Industrial Environmental Research Lab., Cincinnati, Ohio. Food and Wood Products Branch.



# APPROPRIATE TECHNOLOGY ABSTRACTS

## Workshop on In-Plant Waste Reduction in the Meat Industry, Held at University of Wisconsin, Madison, December 13-14, 1973

Final rept.  
Jack L. Witherow, and James F. Scaief. Sep 76, 151p Rept no. EPA/600/2-76/214

Descriptors: \*Water conservation, \*Waste water reuse, \*Meat, \*Food processing, \*Meetings, Animals, Blood, Curing, Brines, Hair, Cleaning, Industrial wastes, Byproducts, Packing(Packaging), Beef cattle, Industrial plants, Removal, Reduction, Water pollution control, Livestock, Waste disposal. Identifiers: \*Meat industry, Slaughtering house wastes, Rendering plants, Slaughtering pens, Feedlot wastes, Offal wastes, Paunch.

Presented are the proceedings of a workshop on in-plant waste reduction in the meat industry. Forty-five participants from industry, government, and private firms exchanged ideas and experiences on waste reduction during the two-day session. Topics covered were: pens, blood conservation and processing, paunch and viscera handling, rendering and plant clean-up operations. Case histories are presented on water conservation in a meat packing plant and in a hog processing plant.

**PB-258 842/4** PC A11/MF A01  
California Univ., Berkeley. Earthquake Engineering Research Center.

**The Seismic Behavior of Critical Regions of Reinforced Concrete Components as Influenced by Moment, Shear and Axial Force**  
Mehmet Bilgin Atalay, and Joseph Penzien. Dec 75, 250p Rept no. EERC-75-19  
Grant NSF-AEN73-07732-A02

Descriptors: \*Buildings, \*Concrete construction, \*Earthquakes, Columns(Supports), Girders, Loads(Forces), Deformation, Stiffness, Mathematical models.  
Identifiers: \*Earthquake engineering.

Building response caused by moderate to severe earthquake excitation is often in the inelastic range; thus, to enable reliable predictions of overall performance, the energy absorption and failure characteristics of individual components must be established. For reinforced concrete frame buildings, the critical or yielding regions may occur in either or both the girders and columns subjected to various combinations of bending, shear, and axial load. To determine the characteristics and modes of failure of columns under excitations causing degradations in stiffness, strength, and energy absorption, a series of twelve members simulating a column between inflection points above and below a floor level were designed and tested dynamically. The variable parameters introduced were (1) magnitude of applied axial load chosen to represent lower, intermediate, and upper story columns, (2) lateral reinforcement percentage chosen to study the influence of confinement on ductility, and (3) history of controlled lateral displacement chosen to determine the effects of rate and sequence loading.

**PB-259 318/4** PC A08/MF A01  
Institute of Gas Technology, Chicago, Ill.

**Wind-Powered Hydrogen Electric Systems for Farm and Rural Use**

Final rept. May-Dec 75  
Raymond R. Tison, Nicholas P. Biederman, Timothy Donakowski, Robert H. Elkins, and Jon B. Pangborn. Apr 76, 171p ERDA/NSF-00772/75/1  
Grant NSF-AER75-00772

Descriptors: \*Wind power generation, \*Systems analysis, Systems engineering, Farms, Rural areas, Electric power consumption, Electric power demand, Electrochemical power generation, Storage batteries, Hydrogen-based energy, Fuel cells, Electrolysis, Hydrogen, Inverters, Energy storage, Computerized simulation, Computer programs, FORTRAN.

Preliminary designs for wind-energy conversion systems supplying the total energy needs of selected farms and a rural home are synthesized. The concept is a fully dedicated system whose components and subsystems are off-the-shelf technology. The principal subsystems and compo-

nents are: (1) input (wind turbine, electrolyzer, and rectifiers); (2) storage (batteries, and storage tanks of hydrogen and hot water); and (3) output (inverter, motor generator, engine generator, and fuel cell). Two methods of energy storage are evaluated for use and subsequently form the bases upon which each design is optimized. It is shown that wind-energy systems based on battery-storage systems are: (1) simpler to construct and maintain; (2) more efficient; and (3) less expensive than those based on hydrogen-storage systems. Further, the relative economics of each wind-energy system are heavily dependent on wind availability, number of days of energy storage required, and the match between the wind energy available and the energy requirement of the load. Of all the energy requirements characterized, the cash grain operation is shown to be the least adaptable to wind-energy systems.

**PB-259 512/2** PC A07/MF A01

Iowa State Univ., Ames.

**Estimating Staffing and Cost Factors for Small Wastewater Treatment Plants Less Than 1 MGD. Part I. Staffing Guidelines for Conventional Municipal Wastewater Treatment Plants Less Than 1 MGD**

E. Robert Baumann, Keith L. McRoberts, and C. E. Smith. Jun 73, 133p  
Grant EPA-5P2-WP-195-0452  
Also available in set of 2 reports as PB-259 511-SET, PC E99/MF E99.

Descriptors: \*Sewage treatment, \*Municipalities, \*Manpower, Objectives, Specifications, Effectiveness, Personnel development, Cost analysis, Job analysis.

This study is one of many which has as its primary objective improved wastewater treatment. In the area of water pollution control, proper wastewater treatment is one such control measure. One mechanism for good control is to insure that new and existing treatment plants are operated by adequate numbers of well-trained staff. This report describes the objectives, manpower planning, and management for treatment plants.

**PB-259 513/0** PC A06/MF A01  
Iowa State Univ., Ames.

**Estimating Staffing and Cost Factors for Small Wastewater Treatment Plants Less Than 1 MGD. Part II. Estimating Costs of Package Wastewater Treatment Plants**

George E. Lamp, Jr., E. Robert Baumann, Keith L. McRoberts, and C. E. Smith. Jun 73, 106p  
Grant EPA-5P2-WP-195-0452  
Also available in set of 2 reports as PB-259 511-SET, PC E99/MF E99.

Descriptors: \*Sewage treatment, \*Cost analysis, Municipalities, Industrial plants, Classifications, Operating costs, Cost engineering, Manufacturers, Estimates, Tables(Data), Capitalized costs, Regression analysis.

Effective and efficient wastewater treatment is a function of both the quality of treatment and the cost of treatment. Although the actual quality and cost of treatment cannot be known until after a plant is in operation, estimates of both are needed at various times during the process of planning and designing a wastewater treatment system. The report describes costs, cost factors, data from manufacturers, and operating package plants.

**PB-259 554-T** PC A05/MF A01  
Agricultural Research Service, Washington, D.C.

**Biology of Peanut Flowering (Biologiya Tsveteniya Arakhisa)**

D. P. Umen. 1976, 77p Rept no. TT-74-52016  
Trans. from Vsesoyuznyi Nauchno-Issledovatel'skii Institut Maslichnykh Kultur. Nauchno-Proizvodstvennyi Sbornik (USSR) n6 1933, by A. K. Dhote. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: \*Peanut plants, \*Plant genetics, \*Plant growth, Plant tissues, Seeds, Humidity, Atmospheric temperature, Books, Translations, USSR.

The translation provides a botanical description of the peanut plant; the flowering habits, artificial hybridization, seed production, morphology, and growth factors.

**PB-259 946/2** PC A13/MF A01  
Envirex Inc., Milwaukee, Wis. Environmental Sciences Div.

**Handbook for Sampling and Sample Preservation of Water and Wastewater**

Contract rept. 28 Jun 74-1 Jun 76  
J. H. Moser, and K. R. Huibregtse. Sep 76, 278p\* EPA/600/4-76/049  
Contract EPA-68-03-2075

Descriptors: \*Water analysis, \*Sampling, \*Reviews, \*Waste water, Sediments, Samplers, Water pollution, Field tests, Sewage, Industrial waters, Agriculture, Physical properties, Flow measurement, Statistical analysis, Surface water runoff, Sources, Chemical properties, Biological automation, Measuring instruments, Sites, Design criteria, Preserving, Handling, Parameters, Sludges, Metals, Microbiology, Pesticides, Herbicides. Identifiers: Procedures, \*Water pollution sampling.

This research program was initiated with the overall objective of providing guidelines for sampling and sample preservation of waters and wastewaters. Information obtained from a review of the literature and the results of a survey of field practices provides the basis for guidelines in general sampling techniques, automatic samplers, flow measuring devices, a statistical approach to sampling, preservation of physical, chemical, biological and radiological parameters, and sampling procedures for waters emanating from municipal, industrial, and agriculture sources. Sampling procedures for surface waters and sludges are also included. This report is not an official EPA manual. Rather, it is a research report which is but one of a series being used as an input to develop EPA Manuals and Guidelines. This report was submitted in fulfillment of Contract No. 68-03-2075 by Envirex, Inc., A Rexnord Company, under the sponsorship of the U.S. Environmental Protection Agency. The report covers the period of June 28, 1974 to June 1, 1976.

**PB-259 956/1** PC A06/MF A01  
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.

**Clean Fuels from Agricultural and Forestry Wastes**

Final rept. Jun 74-Mar 75  
J. W. Tatom, A. R. Colcord, J. A. Knight, and L. W. Elston. Apr 76, 118p EPA/600/2-76/090  
Contract EPA-68-02-1485

Descriptors: \*Fuels, \*Agricultural wastes, \*Wood wastes, \*Reclamation, \*Solid waste disposal, Chars, Manufactured gas, Pyrolysis, Oxidation, Economic analysis, Design, Air pollution abatement, Mobile equipment.  
Identifiers: \*Synthetic fuels.

The report gives results of an experimental investigation of the operating parameters for a mobile waste conversion system based on the Georgia Tech Engineering Experiment Station's partial oxidation pyrolysis process. The object of the testing was to determine the combination of parameters producing the most char and oil and the least gas from agricultural and forestry wastes. The test indicated both the dominant influence of air/feed on char and oil yields, and the desirability of low values of this ratio. In addition to the testing, a preliminary design of a 200 ton/day mobile pyrolysis system for conversion of agricultural and forestry wastes into clean fuels was made and a simplified economic analysis conducted. The results of this work indicate the technical feasibility and the economic profitability of such a system.

**PB-259 964/5** PC A05/MF A01  
Corvallis Environmental Research Lab., College, Alaska. Arctic Environmental Research Station.

**Water Related Utilities for Small Communities in Rural Alaska**

Interim rept. Jul 73-Jun 76  
Bertold Puchler, Barry Reid, and Conrad Christianson. Sep 76, 84p Rept no. EPA/600/3-76/104



## APPROPRIATE TECHNOLOGY ABSTRACTS

Descriptors: \*Sewage treatment, \*Water supply, \*Arctic regions, \*Sanitary engineering, Rural areas, Toilet facilities, Laundries, Sewage disposal, Operating costs, Maintenance, Public utilities, Standards, Alaska.

Identifiers: Eskimos, Tertiary treatment.

The 'Alaska Village Demonstration Projects' were authorized by Section 113, P.O. 92-500 (86 STAT 816), for the purpose of demonstrating methods to improve sanitary conditions in native villages of Alaska. Central community facilities have been constructed in the native villages of Emmonak and Wainwright to provide a safe water supply; toilets, bathing and laundry facilities; and sewage and waste disposal. The idea of coming to a community center to secure water, to do the laundry, and to bathe has proven acceptable to the people of Wainwright and Emmonak. However, Alaskan native villages generally can not pay, through service charges, the full cost of routine operation and maintenance of water-related utilities, especially where complex treatment is required to meet waste treatment standards. The physical-chemical wastewater treatment provided required considerable modification and detailed operator attention to provide consistent secondary treatment.

**PB-259 973/6** **PC A14/MF A01**

Environmental Protection Agency, Cincinnati, Ohio. Office of Technology Transfer.

**Manual of Methods for Chemical Analysis of Water and Wastes**

Jul 76, 317p\* Rept no. EPA/625/6-76/003a

Also available from Environmental Protection Agency, Office of Technology Transfer, Cincinnati, Ohio 45268. See also report dated 1971, PB-211 968.

Descriptors: \*Manuals, \*Water analysis, Chemical analysis, Surface waters, Waste water, Industrial wastes, Water pollution, Arsenic, Boron, Bromides, Chlorides, Colors, Organic compounds, Inorganic compounds, Monitoring, pH, Cyanides, Dissolved gases, Fluorides, Iodides, Metals, Trace elements, Oils, Nitrogen, Phosphorus.

Identifiers: \*Water pollution detection, \*Procedures, Biochemical oxygen demand, Chemical oxygen demand.

This second edition of this manual contains the chemical analytical procedures used in U.S. Environmental Protection Agency laboratories for the examination of ground and surface waters, domestic and industrial waste effluents, and treatment process samples. The manual provides test procedures for the measurement of physical, inorganic and selected organic constituents and parameters.

**PB-259 990/0** **PC A04/MF A01**

Agricultural Research Council, Khartoum (Sudan).

**Report of a Workshop on Aquatic Weed Management: Some Prospects for the Sudan and the Nile Basin, Held at Khartoum, Sudan on 24-29 November 1975**

1975, 65p

Contract AID/csd-2584

Descriptors: \*Aquatic weeds, \*Weed control, \*Meetings, \*Developing countries, Management, Rivers, Lakes, Canals, Recommendations, Utilization, Nile River Basin, Africa.

Identifiers: \*Water hyacinths, \*Sudan Region(Africa).

This is a report of a workshop on the management and utilization of aquatic weeds in the Sudan and the Nile Basin. The workshop, held November 24-29, 1975, formulated recommendations addressed to one of the most critical environmental problems of the region--the weeds that infest the rivers, swamps, lakes and canals. The report addresses both the water hyacinth problem and the problems of canal weeds, most of which are submerged and not readily seen, but which can render canals useless by blocking the water flow. It is written for administrators and scientists in all the countries of the greater Nile watershed and basin, but focuses particularly on the Sudan as a model case for the region.

**PB-259 991/8**

**PC A07/MF A01**

National Academy of Sciences, Washington, D.C. Board on Science and Technology for International Development.

**NAS-CONICET (Argentina) Science Cooperation Program. I. The Argentine Telex Network for Scientific and Technical Information. II. Computer-Based Information Services for Science and Technology**

Rept. for 15 Aug 70-31 Dec 72.

Aug 76, 132p

Contract AID/csd-2584

Includes summary, 1 Jan 73 to present. Prepared in cooperation with Consejo Nacional de Investigaciones Cientificas y Tecnicas, Buenos Aires (Argentina).

Descriptors: \*Information systems, \*International relations, Libraries, Teletypewriter systems, Cooperation, User needs, Services, Project planning, Project management, Argentina.

The NAS-CONICET (Argentina) Science Cooperation Program was initiated by the National Council for Scientific and Technical Research of Argentina (Consejo Nacional de Investigaciones Cientificas y Tecnicas, or CONICET) and the Board on Science and Technology for International Development, Commission on International Relations, National Academy of Sciences (NAS), with support from the US Agency for International Development in Argentina. This report covers project activities in scientific information systems and exchanges, August 15, 1970 through December 31, 1972, and reports briefly on related scientific and technical information activities which have occurred in Argentina since the NAS-CONICET project was terminated.

**PB-259 992/6**

**PC A09/MF A01**

Wisconsin Univ.-Oshkosh.

**Wastewater Treatment by Natural and Artificial Marshes**

Final rept. Jun 72-Jun 76

Frederic L. Spangler, William E. Sloey, and C. W.

Fetter, Jr. Sep 76, 184p EPA/600/2-76/207

Grant EPA-R-803794, EPA-S-801042

Descriptors: \*Marshes, \*Sewage treatment, \*Primary biological productivity, \*Water pollution control, Pilot plants, Municipalities, Phosphorus, Vegetation, Nutrients, Water quality, Removal, Aquatic plants, Harvesting, Effectiveness, Tables(Data).  
Identifiers: Ecosystems, Artificial marshes, \*Scirpus validus.

Investigations were conducted on the use of artificial and natural marshes as purifiers of effluent from municipal treatment plants. Observations were made on marsh influent and effluent quality. Phosphorus distribution in the ecosystem and removal by harvesting were studied. Responses of the vegetation to repeated harvesting were recorded. Artificial marshes consisted of plastic-lined excavations containing emergent vegetation, especially *Scirpus validus*, growing in gravel. Various combinations of retention time, primary effluent, secondary effluent, basin shape, and depth of planting medium were studied. A polluted natural marsh was studied simultaneously. The degree of improvement in water quality suggests that the process may be acceptable for certain treatment applications.

**PB-260 051/8**

**PC A03/MF A01**

Massachusetts Inst. of Tech., Cambridge  
**Contributions from the Sanitary Research Laboratory and Sewage Experiment Station. Volume X. Studies on the Digestion of a Sewage-Filter Effluent by a Small and Otherwise Unpolluted Stream**

Report dated 1 Jul 14-1 Jul 16

Robert Spurr Weston, and C. E. Turner. 1917, 50p

Sponsored in part by Public Health Service, Washington, D. C. Portions of this document are not fully legible.

Descriptors: \*Sewage flow rate, \*Sewage treatment effluent, Sewage bacteria, Sewage disposal, Water pollution, Stream flow, Stream pollution, Waste disposal.

Results are presented of a 2-year study to determine to what extent a stream, lake, or estuary will receive and digest the effluents from sewage purification plants. Emphasis is on the biological aspects. Data indicates that slowly moving water is able to digest and highly purify effluents in large volume with the first three-fourths of a mile. The process of digestion is almost wholly biological and is extremely sensitive to conditions such as temperature, rainfall, and the amount and character of plant and animal life.

**PB-260 469/2**

**PC A02**

Louisiana State Univ., Baton Rouge. School of Forestry and Wildlife Management.

**Two Major Problems in Culturing Crayfish in Ponds: Oxygen Depletion and Overcrowding**

James W. Avault, Jr, Larry W. de la Bretonne, and Jay Huner. 1974, 9p LSU-R-74-022, NOAA-76082609

Pub. in Proceedings of the International Crayfish Symposium (2nd), Baton Rouge, La. 1974 p139-144 1974.

Descriptors: \*Crayfishes, \*Aquaculture, Ponds, Oxygen, Dissolved gases, Water quality, Harvesting, Recommendations.

Identifiers: Sea Grant program, Reprints.

The two major problems in culturing crayfish in ponds are low dissolved oxygen and overcrowding. This paper discusses general field observations of pond failures and suggests solutions. Poor water quality is attributed to one or more of the following: Source water of poor quality; pond heavily grown over with terrestrial vegetation at time of flooding; other farm crops occupy the time of the crayfish farmer and poor water circulation in ponds. Two major reasons for overcrowding are that not enough food is available and there is inadequate harvest. Inadequate harvesting results from: not enough traps used; not harvesting daily; high cost of bait; an abundant supply of wild crayfish; and other farm duties.

**PB-260 606/9**

**PC A14/MF A01**

National Academy of Sciences, Washington, D.C.  
**Energy for Rural Development: Renewable Resources and Alternative Technologies for Developing Countries**

1976, 306p\*

Contract AID/csd-2584

Descriptors: \*Developing countries, \*Rural areas, \*Regional planning, \*Energy sources, Solar energy conversion, Wind power, Windpower utilization, Hydroelectric power, Photosynthesis, Geothermal energy conversion, Energy storage, Reviews, Reviewing.  
Identifiers: Biological energy conversion.

This report provides a summary of the state of the art of alternative technologies frequently suggested as solutions to rural or individual-family energy needs. Moreover, it informs both the technologist and the planner where to go for more detailed information and what kinds of research and development are needed before a particular device or process is ready for use.

**PB-260 633/3**

**PC A04/MF A01**

Illinois Dept. of Business and Economic Development, Springfield. Div. of Energy.

**Energy Recovery from Solid Waste: A Review of Current Technology**

Final rept.

Dugald O. Black. Jul 76, 68p\* NSF/IDOE-76-05

Descriptors: \*Energy sources, \*Solid waste disposal, \*Reclamation, \*Refuse disposal, Pyrolysis, Incinerators, Biodeterioration, Design, Technology, Cost analysis, Reviews.  
Identifiers: Incineration.

This report was written to aid a community in selecting an energy recovery solid waste disposal system that best fits their needs. The choice of an appropriate conversion process for energy recovery is highly sensitive to each local situation. A critical factor to be considered in the selection of any conversion process is the economic aspect of each system. A discussion of the economic factors



# APPROPRIATE TECHNOLOGY ABSTRACTS

and the relative advantages and disadvantages of each process is included.

**PB-260 763/8** PC A08/MF A01  
Stanford Research Inst., Menlo Park, Calif.  
**An Evaluation of the Use of Agricultural Residues as an Energy Feedstock. Volume I**  
J. A. Alich, Jr., R. E. Inman, and K. Ernest. Jul 76, 164p\* NSF/RANN/SE/GI-18615/FR/76/3, NSF/RA-760286  
Grant NSF-AER74-18615-A03  
See also Volume 2, PB-260 764. Continuation of Grant NSF-GI-18615.

Descriptors: \*Agricultural wastes, \*Energy sources, \*Waste utilization, \*Organic wastes, Farm crops, Fertilizers, Wastes, Forest trees, Trees(Plants), Bark, Wood, Plant residues(Organic), Waste management, Materials recovery, Electric power generation, Manufactured gas, Low btu gas, High btu gas, Methane, Anaerobic processes, Cost analysis, Cost estimates, Inventories.  
Identifiers: Manure, Energy resources, Feedstocks.

Since agricultural residues (crop and forest wastes and animal manures) constitute a potential supplemental source of energy, the authors examine the availability of such residues and evaluate their potential use as an energy feedstock. The report is presented in two volumes: the method of approach used in inventory development, the collection, harvesting, and conversion economics, and the overall concept assessment are presented in Volume I.

**PB-261 002/0** PC A02/MF A01  
Washington State Univ., Pullman.  
**Apply Pesticides Correctly. A Guide for Commercial Applicators. Right-Of-Way Pest Control**  
Dean G. Swan. 1976, 17p EPA/540/8-76/029  
Contract EPA-68-01-2263  
Prepared in cooperation with North Carolina State Univ., Raleigh, Washington State Highway Commission, Olympia, and Minnesota Dept. of Highways, St. Paul. See also PB-257 723.

Descriptors: \*Herbicides, \*Weed control, \*Highways, Manuals, Plant growth, Plant regulators, Standards, Grasses, Shrubs, Vegetation, States(United States), Windward drift, Right of way acquisition.

This guide contains basic information to help meet specific standards for applicators who are engaged in right-of-way weed control. Because the guide was prepared to cover the entire nation, some information important to specific states might not be included.

**PB-261 033/5** PC A12/MF A01  
Michigan Univ., Ann Arbor. Dept. of Natural Resources.  
**The Social and Economic Importance of the Caroni Swamp in Trinidad and Tobago**  
Doctoral thesis  
Bal Siew Ramdial. 1975, 270p NOAA-76092907

Descriptors: \*Recreation, \*Economic development, \*Caroni Swamp, Land use, Assessments, Fishing, Shellfish, Natural resources, Recreational facilities, Social effect, Values, National parks, Theses, Trinidad and Tobago.  
Identifiers: Sea Grant program, \*Tourism.

The purpose of this study was to assess the social and economic values of the Caroni Swamp as of 1974 and to generate more attention and wider public interest in one of Trinidad and Tobago's most beautiful landscapes. The study finds that various unmet need states such as temporary escape, experiencing nature, intellectual stimulation, affiliation, achievement and physical exercise are gratified by a visit to the Swamp. Over 90% of the visitors thought it worthy of preservation. The study estimates the recreational resources of the Swamp at \$1,038,500 and the number of persons earning a living at 240 full-time and 105 part-time. It estimates the fin and shell fish harvest and value at 1,589,170 lbs. and \$981,450 and based on a total annual return of \$2,020,020, calculates the present worth of the Swamp at \$4,000 per acre.

The study concludes that the Swamp, though neglected, has many social and economic values beyond tourism.

**PB-261 091/3** PC A02/MF A01  
Environmental Protection Agency, Washington, D.C. Office of Solid Waste Management Programs.  
**Anaerobic Digestion of Solid Waste and Sewage Sludge to Methane**  
Steven J. Hite. Jul 75, 17p Rept no. EPA/530/SW-159

Descriptors: \*Solid waste disposal, \*Sludge disposal, \*Anaerobic processes, \*Methane, Synthetic fuels, Manufactured gas, Sewage disposal, Refuse disposal, Organic wastes, Waste processing, Reclamation, Economic analysis, Feasibility.  
Identifiers: \*Sewage sludge, Refused derived fuels.

The primary objective of this report is to evaluate the potential for processing organic wastes (solid waste and sewage sludge) using a controlled anaerobic digestion process for the purpose of producing methane.

**PB-261 268/7** PC A02/MF A01  
Skokomish Tribal Council, Shelton, Wash.  
**Fish Processing Plant Management Assistance for Skokomish Tribal Council, Mason County, Washington**  
Nov 76, 12p EDA-76-073  
Grant EDA-07-6-01480

Descriptors: \*Food processing, \*Fishes, \*Economic development, American Indians, Industrial plants, Marketing, Inventories, Accounting, Employment, Production planning, Revenue, Sales, Indirect costs, Training, Personnel, Salmon, Environmental impacts, Industrial waste treatment, Tables(Data), Washington(State).  
Identifiers: \*Mason County(Washington).

This study seeks to provide assistance and training of tribal members in the management, processing, and marketing of salmon and seafood in the new tribally owned processing plant. Along with the training of personnel to operate the plant, the plant seeks to establish accounting, inventory and production systems. The benefits of the plant would be three fold. First, the plant would insure that fishermen would receive a fair price for their catch. Second, employment for tribal members on the reservation would be created and third, the seafood processing plant would have the potential of earning sufficient revenues to be used for the development of additional business and jobs.

**PB-261 818/9** PC A06/MF A01  
Asian Inst. of Tech., Bangkok (Thailand).  
**Ferrocement, A Versatile Construction Material: Its Increasing Use in Asia**  
Ricardo P. Pama, Seng-Lip Lee, and Noel D. Vietmeyer. 1976, 114p\*  
Proceedings of Workshop on Introduction of Technologies in Asia-Ferrocement, a case study. Held at Bangkok (Thailand) on November 5-8, 1974. Sponsored in Part by Agency for International Development, Washington, D.C. Office of Science and Technology, and National Academy of Sciences, Washington, D.C.

Descriptors: \*Reinforced concrete, \*Meetings, Thailand, Construction materials, Concrete construction, Shipbuilding, Technology transfer, Residential buildings, Bins, Water tanks.  
Identifiers: \*Ferrocement.

The workshop brought together engineers, scientists, administrators, and businessmen and gave them the opportunity to exchange views on, and experience with, ferrocement. The workshop's basic purposes were: (1) to survey both the state of the art of ferrocement technology and its applications important to Southeast Asia; (2) to provide information on ferrocement research and development taking place in Asia and to share the knowledge and experience gained thus far; (3) to discuss the most promising methods of introducing ferrocement technology to Asia from the point of view of effectiveness, cost, and social acceptability; (4) to recommend areas of technical and social research that need to be carried further with re-

spect to ferrocement. Demonstrations of ferrocement construction were held during the workshop. Fifty five participants from 17 nations attended. Immediately following the workshop, a demonstration for the benefit of some 50 village heads from several districts in Pathumtani province was held.

**PB-261 939/3** PC A12/MF A01  
Woods Hole Oceanographic Institution, Mass.  
**Marine Polyculture Based on Natural Food Chains and Recycled Wastes**  
Technical rept.  
John H. Ryther. Oct 76, 275p WHOI-76-92, NOAA-76111019  
Contract E(11-1)-2948, Grant NOAA-04-6-158-44016

Descriptors: \*Aquaculture, \*Algae, \*Sewage treatment, \*Food chains, Nitrogen cycle, Waste water reuse, Sea water, Circulation, Oysters, Clams, Mussels, Shellfish, Growth, Mollusca, Nutrients, Crustacea, Invertebrates, Fishes, Sea grasses, Lobsters, Tables(Data).  
Identifiers: Sewage effluents, \*Waste water, \*Secondary sewage treatment.

Research has continued during the past Sea Grant fiscal year on the development, testing, and evaluation of a combined waste recycling-marine polyculture system. The concept of the system is to grow unicellular marine algae (Phytoplankton) in mixtures of seawater and the effluent from a secondary sewage treatment plant. The algae grown in continuous flow-through cultures, are then fed to bivalve molluscs, such as oysters, clams, scallops, or mussels. The algae remove the nutrients from the wastewater and the molluscs remove the algae. Finfish (winter flounder) and crustacea (American Lobster) are stocked as post-larval or juvenile animals together with the molluscs to feed upon the solid wastes (feces and pseudo feces) produced by the shellfish and upon the small invertebrate fauna (polychaete worms, amphipods, etc.) that are supported by these wastes. Seaweeds constitute a final polishing stage to the system, receiving the effluent from the animal culture system and removing from it nutrients regenerated through excretion and metabolism of the animals as well as any nutrients from the wastewater not initially removed by the phytoplankton. Twelve reports by various authors are compiled in this volume.

**PB-262 039/1** PC A04/MF A01  
Woods Hole Oceanographic Institution, Mass.  
**Marine Technology Transfer as Foreign Aid to Less Developed Nations from Oceanographic Institutions in Industrialized Countries: A Search for an Effective Mechanism in the Educational Sector**  
Technical rept.  
M. Lamin Sarr. Sep 76, 59p WHOI-76-84, NOAA-76111031  
Grant NOAA-04-6-158-44016

Descriptors: \*Marine engineering, \*Technology transfer, \*Developing countries, Systems analysis, Organizations, Performance evaluation, Oceanography, Training devices, Organizations, Problem solving, Personnel development, Scientists, Foreign aid.  
Identifiers: Deficiencies, Industrialized countries.

This study examines systems of transferring marine technology through education and training and suggests solutions to the problems that have been the cause of failure in the process. In so doing, the nature of the educational institutions, both in the industrialized nations and in those developing nations where they exist have been reviewed. Inadequacies have been identified at both levels; inadequacies that stem not only from the educational systems but also concerning government involvement as well as social attitudes. This problem identification is followed by suggested solutions for each case and in some instances such suggestions are supported and substantiated with descriptions of cases where success or at least potential for success have been achieved.



# APPROPRIATE TECHNOLOGY ABSTRACTS

**PB-262 055/7** PC A03/MF A01  
National Research Council, Washington, D.C.  
Board on Science and Technology for International Development.  
**The Role of U.S. Engineering Schools in Development Assistance**  
Rept. for Sep 73-Jun 75.  
1976, 39p\*  
Contract AID/csd-2584  
Library of Congress catalog card no. 76-62526.

Descriptors: \*Developing countries, \*Technical assistance, \*Engineering schools, United States, Roles(Behavior), Economic development, Education, Constraints, Forecasting, Recommendations, Surveys, Meetings, Opinions.  
Identifiers: Priorities.

This report is one of a series undertaken under the auspices of the Board on Science and Technology for International Development (BOSTID) of the Commission on International Relations of the National Research Council, a joint agency of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The report was requested by the Agency for International Development. The panel responsible for the report was composed of educators from engineering schools in the United States and developing countries, along with one engineer from an international technical assistance agency. Together they represent a cross section of engineering disciplines. The project was designed to obtain informed judgments of panelists on the future role of U.S. engineering institutions in assisting developing nations. It was not intended to be a formal research exercise. The report is based upon deliberations of the panel in September 1973, January 1974, and June 1975, and upon subsequent discussions by members of the panel. Preliminary work had been done by another panel during 1971-72.

**PB-262 179/5** PC A08/MF A01  
Connecticut Valley Historical Museum, Springfield, Mass.  
**The Upper Factory Brook Sawmill Site: An Early Industrial Site in Middlefield, Massachusetts**  
Final rept. May 74-Apr 76  
John S. Wilson. Apr 76, 174p  
Contract NPS-CX-4000-4-0026

Descriptors: \*Sawmills, \*Technology, \*History, Methodology, Rural areas, Sites, Massachusetts, Equipment.  
Identifiers: Shortcomings, Artifacts, \*Middlefield(Massachusetts).

The rural millwright of colonial or early 19th-century America derived much of his technical information from sources very unlike the engineering texts of today. At best, he followed manuals which relied heavily upon 'rule-of-thumb' procedures. At worst, he used only his own experience as a guide. The results of such irregular information flow in a fairly technical craft have seldom been considered. The Upper Factory Brook Sawmill Site, an early 19th-century mill, was constructed by men relying on 'folk' knowledge, and exhibits several major flaws in its construction. These flaws demonstrate the problems resulting from an incomplete 'mental template' of a complex mechanism due to the incorrect or incomplete 'folk' knowledge of the builders, and indicate one of the effects of poor communication during a period of general technological advancement.

**PB-262 338/7** PC A05/MF A01  
National Center for Appropriate Technology, Butte, Mont.  
**A National Program to Develop and Implement Technologies Appropriate for Low-Income Communities**  
7 Sep 76, 93p OEO-LN-1710

Descriptors: \*Community development, \*Technology innovation, Low income groups, Energy, Conservation, Socioeconomic status, Information centers, Weatherproofing, Hydroponics, Solar heating, Wastes, Project planning.

The proposal for a National Center for Appropriate Technology suggests a program of research and

development, with a specific mission in its first year of developing, modifying, adapting, and implementing technologies which can be helpful to poor people. Particularly it deals with the problems of rapidly increasing energy cost, and with a specific focus on technological support to the CSA Weatherization Program.

**PB-262 488/0** PC A15/MF A01  
Action/Peace Corps, Washington, D.C. Information Collection and Exchange.  
**Guide for Field Crops in the Tropics and the Subtropics**  
Program and training journal reprint series  
Samuel C. Litzenberger. Sep 76, 332p Rept no. Reprint Ser-10  
Prepared by Agency for International Development, Washington, D.C. Crops Production Div.

Descriptors: \*Farm crops, \*Agronomy, \*Tropical regions, Grain crops, Grains(Food), Leguminous plants, Oilseed crops, Fruits, Vegetables, Fiber crops, Tobacco plants, Manuals.

## Contents:

The tropical environment for crop production;  
Farming systems for the tropics and subtropics;  
General principles of improved crop production in the tropics and subtropics;  
Cereal crops;  
Food grain legumes;  
Oil seed crops;  
Starchy crops;  
Fiber crops;  
Special crops.

**PB-262 489/8** PC A09/MF A01  
Katzen (Raphael) Associates, Cincinnati, Ohio.  
**Chemicals from Wood Waste**  
Final rept.  
Allan E. Hokanson, Vincent B. Diebold, Douglas W. Bennett, Russell P. Klier, and Stephen A. Stein. 24 Dec 75, 196p Rept no. AN-441  
Sponsored in part by Forest Products Lab., Madison, Wis.

Descriptors: \*Organic compounds, \*Wood wastes, Economic analysis, Cost estimates, Carbinols, Methyl alcohol, Ethanol, Phenols, Furfurals, Formaldehyde, Operating costs, Capitalizing costs, Industrial plants, Process charting, Design criteria, Paper industry, Production.

A study of the economics of producing chemicals from wood waste was carried out for the Forest Products Laboratory. Results included: (1) outlining chemical processes based on known technology for producing methanol, ethanol, formaldehyde, furfural, and phenols from wood waste; (2) estimating investment and operating costs for these plants; and (3) comparing the economics with those for producing the same chemicals from more conventional raw materials.

**PB-262 511/9** PC A05/MF A01  
Action/Peace Corps, Washington, D.C. Information Collection and Exchange.  
**Visual Aids - A Guide for Peace Corps Volunteers**  
Program and training journal reprint series.  
Mar 76, 82p Rept no. Reprint Ser-2

Descriptors: \*Visual aids, \*Public health, \*Developing countries, \*Handbooks, Instructional materials, Social welfare, Personnel development, Technology, Instructional materials, Selection, Methodology, Reference groups, Preparation, Fabrication, Motivation, International relations, Symbols.  
Identifiers: Latrines, Peace Corps, Volunteers.

This volume, part of the Program and Training Journal Reprint Series, is integral to Peace Corps efforts to provide technical support to its Volunteers and to share its material on intermediate technology with other participants in the international development community. Successful intermediate technologies designed for use in developing countries utilize low cost, locally available resources and provide new methods and approaches that are relevant to the needs of the users. While supplementing, testing, and modifying the materials made and used volunteers will con-

tinue to develop new techniques and strategies. The questions, developments and adaptations will provide a framework for future manuals.

**PB-262 606/7** PC A04/MF A01  
ACTION/Peace Corps, Washington, D.C. Information Collection and Exchange.  
**Health Education: A Study Unit on Fecal-Borne Diseases and Parasites**  
Program and training journal reprint series  
Merry Lee Corwin. Mar 76, 60p Rept no. Reprint Ser-1  
Prepared by Peace Corps/Philippines.

Descriptors: \*Health education, \*Parasitic diseases, Manuals, Public health, Feces, Infectious diseases, Parasites, Life cycles, Disease vectors, Preventive medicine, Philippines, Developing countries.

The purpose of this unit is to help the student reach a real understanding of how a person's habits determine his health. Through a step-by-step learning procedure, this unit is designed to present the knowledge necessary to gain this understanding in a logical progression. The child should be educated about these diseases so that in the end he will understand (1) that these diseases are important to know about; (2) that a certain few things are spreading them; (3) that these diseases can be prevented; (4) that each person is responsible for the state of his own health. All these diseases are prevalent in the Philippines, and they are here mainly because most people simply do not know about them and how they are spread and how serious they are. It has been found that if this unit is well taught in the school, it can generate effects which will result in the improvement of health and sanitation practices in the community.

**PB-262 630/7** PC A03/MF A01  
ACTION/Peace Corps, Washington, D.C. Information Collection and Exchange.  
**Peace Corps Intermediate Technology for 15 Years**  
Program and training journal reprint series.  
May 76, 32p Rept no. Reprint Ser-A

Descriptors: \*Mechanical engineering, \*Developing countries, \*Technology innovation, Manuals, Experimental design, Performance evaluation, Equipment, Creativity, Centrifuges, Dusting, Bel-lows, Pest control, Braille, Blocks, Grain, Storage, Drying apparatus, Silos, Construction, Earthquake resistant structures, Tiles, Roofs.  
Identifiers: \*Contrived equipment, Peace Corps, Volunteers, Letter blocks, Crop dusters, Grain storage.

The effort to devise and implement intermediate technologies has been a hallmark of Peace Corps activity since the organization's inception in 1961. A major effort is currently underway to take Volunteer-developed technologies beyond the areas where they were first devised and to make them available to the wide range of development workers who may need them. Manuals are issued that review Peace Corps-generated materials.

**PB-262 631/5** PC A06/MF A01  
ACTION/Peace Corps, Washington, D.C. Information Collection and Exchange.  
**Agricultural Mathematics for Peace Corps Volunteers**  
Program and training journal reprint series.  
Mar 76, 103p Rept no. Reprint Ser-4  
Prepared by Development and Resources Corp., Washington, D.C., Contract PC-73-1034.

Descriptors: \*Agriculture, \*Mathematical analysis, Handbooks, Measurement, Water flow, Irrigation, Construction, Construction materials, Foundations, Concrete, Agricultural machinery, Units of measurement, Runoff, Yield, Farm crops.

This manual is designed to convey insights into various agricultural practices and techniques. Primary emphasis is given to providing answers and procedures for the solution of specific agricultural mathematical problems. These areas include: Water and irrigation, construction, land leveling and crop



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production, agricultural machinery, and general agricultural information.

**PB-262 735/4** PC A07/MF A01  
Texas Univ. at Austin. Center for the Study of Human Resources.  
**An Analysis of Selected Start-Up Industry Training Programs as Vehicles for Human Resources Development**  
Final rept. Aug 73-1976  
Roy R. Van Cleve. Dec 76, 135p DLMA-21-48-74-01-1  
Grant DL-21-48-74-01  
Extracts Presented - Task Force on Southern Rural Development, August, 1975. ASSA December 1975, Dallas.

Descriptors: \*Industrial training, \*Technology innovation, \*Economic development, \*Low income groups, Manpower utilization, Upgrading, Salaries, Personnel development, Hypotheses, Regression analysis, Projects, Evaluation, Unemployment, South Carolina, North Carolina, Virginia, Alabama, Counties, Socioeconomic status, Regional planning, Specialized training, Economic surveys.  
Identifiers: Underemployment.

The 'start-up' industry training concept has received considerable attention as a way to better match workers and jobs, to 'leapfrog' the industrial development process by attracting higher-wage industry to an area through upgrading local work forces, and to make it possible to increase the wages of low-income workers. This study examines in detail the programs of South Carolina, North Carolina, Virginia and Alabama and their effect on industrial relocation trends and the leapfrogging of the unemployed and underemployed into the labor force.

**PB-262 745/3** PC A06/MF A01  
ACTION/Peace Corps, Washington, D.C. Information Collection and Exchange.  
**A Glossary of Agricultural Terms: English-Spanish, Spanish-English**  
Program and training journal reprint series.  
Mar 76, 103p Rept no. Reprint Ser-9  
Prepared by American Univ., Washington, D.C. American Language Center. Sponsored in part by International Cooperation Administration, Washington, D.C.

Descriptors: \*Agriculture, Dictionaries, Spanish language, English language, Instructional materials.

This bilingual glossary is a modest attempt to fill one of the needs of Spanish-speaking agriculturists receiving training under the program of the International Cooperation Administration. The list is not complete in any sense. It is based largely on suggestions made by experts engaged in the training of foreign agricultural specialists both abroad and in the United States.

**PB-262 746/1** PC A08/MF A01  
ACTION/Peace Corps, Washington, D.C. Information Collection and Exchange.  
**Crop Production Handbook for Peace Corps Volunteers**  
Program and training journal reprint series.  
Mar 76, 153p Rept no. Reprint Ser-6  
Prepared by Development and Resources Corp., Washington, D.C., Contract PC-73-1034.

Descriptors: \*Agriculture, \*Farm crops, Manuals, Production, Climate, Soil properties, Soil classification, Soil fertility, Fertilizers, Weed control, Plant growth, Insect control, Entomology, Grain crops, Plant diseases, Leguminous plants, Sugar beets, Fiber crops, Oilseed crops.

This manual is designed to convey insights into basic crop production principles and practices. Primary emphasis is given to providing explanation and illustration of soil, plant, and water relationships as they affect crop production. Care has been taken to make the content realistic and meaningful and to present it with as non-technical a vocabulary as is possible.

**PB-262 747/9** PC A06/MF A01  
ACTION/Peace Corps, Washington, D.C. Information Collection and Exchange.  
**Irrigation - Principles and Practices for Peace Corps Volunteers**  
Program and training journal reprint series.  
Mar 76, 116p Rept no. Reprint Ser-5  
Prepared by Development and Resources Corp., Washington, D.C., Contract PC-25-1703.

Descriptors: \*Irrigation, \*Agriculture, Manuals, Control equipment, Subsurface irrigation, Surface irrigation, Sprinkler irrigation, Soil properties, Soil water, Pipelines, Pumps, Drainage, Runoff, Salinity, Ditches, Weirs, Soil texture, Tables(Data).

Contents:  
Irrigation principles;  
Water measurement;  
Irrigation water control;  
Drainage;  
Irrigation planning and special information related to irrigated crop production and relevant problems;  
Explanation for irrigation implements;  
Plans for animal drawn implements useful in field preparation for irrigation.

**PB-262 748/7** PC A06/MF A01  
Washington State Dept. of Fisheries, Olympia.  
**Library Search of Japanese Fishery Research Publications**  
Completion rept. 1 Apr-31 May 76  
Ronald E. Westley. Sep 76, 112p NOAA-76112401

Descriptors: \*Shellfish, \*Aquatic animals, \*Bibliographies, Clams, Shrimps, Mollusca, Squids, Cephalopoda, Aquaculture, Reproduction(Biology), Life cycles, Growth, Japan, United States.

The marine animals, abalone, clams, scallops, squid, and shrimp, are all important marine resources; and because of this, they require careful management for optimal utilization. In order to determine the best management strategies, it is necessary to understand the research that has been done both in the U.S. and abroad. This report was prepared to indicate the extent of the literature on each of these animals, and special emphasis has been placed on the literature from Japan. This listing should make it possible to determine whether the preparation of up-to-date review papers would be beneficial. The references are organized by topic; under each topic the references are listed in alphabetical order by author.

**PB-262 754/5** PC A14/MF A01  
ACTION/Peace Corps, Washington, D.C. Information Collection and Exchange.  
**Health Training Resource Material for Peace Corps Volunteers**  
Program and training journal reprint series.  
1976, 318p Rept no. Reprint Ser-3

Descriptors: \*Specialized training, \*Hygiene, \*Developing countries, \*Health education, Nutrition, Sanitation, Children, Food, Clothing, Washing, Insect control, Public health, Instructional materials.  
Identifiers: Peace Corps volunteers.

This volume, part of the Program and Training Journal Reprint Series, is integral to Peace Corps efforts to provide technical support to its Volunteers and to share its material on 'intermediate technology' with other participants in the international development community. Successful intermediate technologies designed for use in developing countries utilize low cost, locally available resources and provide new methods and approaches that are relevant to the needs of the users. Each Reprint, concentrating on a specific topic, is intended to contribute to PCVs' ability to respond creatively to challenges in the field.

**PB-262 768/5** PC A04/MF A01  
ACTION/Peace Corps, Washington, D.C. Information Collection and Exchange.  
**An Expanded Collection of Language Informant Techniques**  
Program and training journal reprint series  
Gary Engelberg. Jun 76, 58p Rept no. Reprint Ser-12

Prepared by ACTION/Peace Corps, Dakar (Senegal). Regional Training Resource Office.

Descriptors: \*Languages, \*Learning, Methodology, Specialized training, Developing countries.  
Identifiers: Peace Corps volunteers.

Techniques for learning the sounds and structures of a language, especially unwritten, from native speakers of the language, usually pedagogically unskilled and often unlettered, have long been part of modern descriptive linguistics. But the Peace Corps has only recently recognized their value. Their purpose is to allow PCVs to: (1) Continue language learning in the field without trained teachers; (2) avoid the pitfall of talking about language through involved grammatical discourse with local 'scholars'; (3) develop their own materials concentrating on problems peculiar to their dialect area and job when texts, especially drills and exercises, are unavailable; and (4) create varied and interesting learning sessions for both Volunteer and informant.

**PB-262 769/3** PC A06/MF A01  
ACTION/Peace Corps, Washington, D.C. Information Collection and Exchange.  
**Soils, Crops, and Fertilizer Use. A Guide for Peace Corps Volunteers**  
Program and training journal reprint series  
Dave Leonard. Mar 76, 111p Rept no. Reprint Ser-8  
Prepared by Peace Corps Training Center, Arecibo, Puerto Rico.

Descriptors: \*Agriculture, \*Soils fertility, \*Farm crops, Soil profiles, Fertilizers, Recommendations, Soil tests, Acidity, pH, Calcium oxides, Manuals.

Contents:  
Some facts about soils;  
Understanding soil fertility;  
Organic fertilizers;  
Chemical fertilizers;  
How to determine fertilizer needs;  
Using fertilizers;  
Getting the most out of fertilizers;  
Liming soils.

**PB-262 820/4** PC A03/MF A01  
ACTION/Peace Corps, Washington, D.C. Information Collection and Exchange.  
**Tales of Wisdom in Folly - A Course in Controlled Composition**  
Program and training journal reprint series  
Joan Kayeum. Jun 76, 49p Rept no. Reprint Ser-13

Descriptors: \*Specialized training, \*Writing, English language, Syntax, Instructional materials, Students.  
Identifiers: Peace Corps volunteers, English(Second language).

Wisdom in Folly is a collection of Mullah Nasruddin tales that are commonly enjoyed in Afghanistan. These tales have been adapted to form a course in controlled composition for students studying English as a foreign language at the Faculty of Education, Kabul University. It is patterned after a controlled writing course titled Ananse Tales by Gerald Dykstra and Richard and Antonette Port.

**PB-262 851/9** PC A05/MF A01  
ACTION/Peace Corps, Washington, D.C. Information Collection and Exchange.  
**L'Utilisation du Silo Fosse et des Lecons Techniques. (The Use of Pit Silos, and Technical Lessons.)**  
Program and training journal reprint series  
Leslie A. Temanson. Jun 76, 76p Rept no. Reprint Ser-15  
Text in French. Adapted from a brochure, 'Les Silos Fosses dans le Savane Africaine' by James E. Diamond, 1971.

Descriptors: \*Silos, \*Underground storage, Developing countries, Africa, Agriculture, Instructional materials.

The report describes the construction, use, and maintenance of underground silos for agricultural purposes. Also included is an instruction manual



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related thereto. (Portions of this document are not fully legible.)

**PB-262 928/5** **PC A17/MF A01**  
ACTION/Peace Corps, Washington, D.C. Information Collection and Exchange.

**Glossary of Environmental Terms: Spanish-English, English-Spanish**

Program and training journal reprint series

Richard E. Saunier. Jun 76, 390p Rept no.

Reprint Ser-17

Descriptors: \*Dictionaries, Spanish language, English language, Words(Language), Environments.

This volume, part of the Program and Training Journal Reprint Series, is integral to Peace Corps efforts to provide technical support to its Volunteers and to share its material on 'intermediate technology' with other participants in the international development community. This glossary was not compiled to standardize usage. Rather it was compiled for the use of Peace Corps Volunteers who, because of where, how and why they work, are required daily to communicate in terms that are often neither cultured nor correct.

**PB-262 929/3** **PC A16/MF A01**  
ACTION/Peace Corps, Washington, D.C. Information Collection and Exchange.

**Combatting Hansen's Disease**

Program and training journal reprint series

Daniel T. Pekarske. Jun 76, 371p Rept no.

Reprint Ser-16

Descriptors: \*Leprosy, Developing countries, Manuals, Bacterial diseases, Infectious diseases, Mycobacterium leprae, Physiology, Pathophysiology, Immunology, Epidemiology, Pathology, Clinical medicine, Public health, Health education, Diagnosis, Chemotherapy, Social welfare, Patients, South Korea, Health science centers, Government, Preventive medicine.

Identifiers: \*Hansen's disease, Chronic disease management.

Contents:

Pertinent physiology and immunology;  
Hansen's Disease--three perspectives;  
Health education;  
Case finding;  
Diagnosis;  
Patient management;  
Cooperating institutions.

**PB-262 951/7** **PC A04/MF A01**  
ACTION/Peace Corps, Washington, D.C. Information Collection and Exchange.

**Guidelines for Development of a Home Industry**

Program and training journal reprint series

Lynn Olcott. Jun 76, 68p Rept no. Reprint Ser-14

Descriptors: \*Handicapped persons, \*Rehabilitation, Crafts, Project management, Marketing, Social welfare, Manuals, Ethiopia.

Identifiers: Peace Corps volunteers.

This book attempts to describe the operations of the Volunteer Rehabilitation Project (VRP), a handicraft project for handicapped persons (mostly leprosy patients) in Ethiopia. The goal is to establish a setting in which handicapped persons can, by modifying known skills and learning new skills, earn a living wage; thereby allowing handicapped persons to be economically self-sufficient members of society.

**PB-263 089/5** **PC A09/MF A01**  
Hawaii Univ., Honolulu. Water Resources Research Center.

**Eutrophication and Fish Toxicity Potentials in a Multiple-Use Subtropical Reservoir**

Technical rept.

Reginald H. F. Young, Gordonn L. Dugan, L. Stephen Lau, and Hiroshi Yamauchi. Jul 75, 191p TR-89, W77-03825

Descriptors: \*Water pollution, \*Reservoirs, \*Sewage treatment, \*Aquatic biology, Algae, Growth, Fishes, Toxicity, Phosphorus, Nitrogen, Bioassay, Concentration(Composition),

Tables(Data), Sediments, Chlorine, Tolerances(Physiology), Nutrients, Oxygen, Dissolved gases, Oahu Island, Hawaii.

Identifiers: \*Eutrophication, \*Wahiawa Reservoir, \*Water quality data.

The impact of secondary-treated effluents from the Wahiawa and Whitmore Sewage Treatment Plants on the Wahiawa Reservoir, Oahu, was investigated in terms of water and sediment quality, algal growth potential, and fish toxicity. Reservoir and waste water management alternatives were investigated based on these environmental inputs and preliminary estimates of costs and benefits of the alternatives. Nitrogen and phosphorus resulting from the discharges were determined to be responsible for seasonal stresses on both the water quality and fishes. The two most feasible alternatives for improving the situation were reuse of secondary effluent for sugarcane irrigation and seasonal tertiary waste water treatment with the latter being the more favored of the two.

**PB-263 155/4** **PC A22/MF A01**  
Office of Water Research and Technology, Washington, D.C. Water Resources Scientific Information Center.

**Irrigation Efficiency. A Bibliography. Volume 2**

Rept. for Mar 73-Sep 76.

Dec 76, 512p\* Rept nos. OWRT/WRSIC-76/206,

W77-03968

See also PB-220 349.

Descriptors: \*Irrigation, \*Bibliographies, Efficiency, Farm crops, Water supply, Sprinkler irrigation, Sub-surface irrigation, Surface irrigation, Patents, Water conservation, Soil moisture, Deserts, Arid land, Salinity, Agronomy, Ground water, Pumping.

Identifiers: \*Drip irrigation, Trickle irrigation.

This report, containing 346 abstracts, is another in a series of planned bibliographies in water resources produced from the information base comprising SELECTED WATER RESOURCES ABSTRACTS (SWRA). Volume 2 covers the period from March 1973 through September 1976 (Volume 9, Number 18). Author and subject indexes are included.

**PB-263 175-T** **PC A08/MF A01**  
Agricultural Research Service, Washington, D.C.  
**Pollination of Entomophilous Agricultural Crops by Bees**

1976, 159p Rept no. TT-74-52010

Trans. of mono. Opylenie Pchelami Entomofilykh Selskokhozyaystvennykh Kultur, Moscow, 1972, by V. S. Kothekar. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: \*Farm crops, \*Pollen, \*Bees, Arthropoda, Seeds, Apple trees, Leguminous plants, Toxicology, Books, Production, Economic factors, Oilseed crops, Forest land, Citrus trees, Food, Greenhouses, Polar regions, Yield, Translations, USSR.

Identifiers: \*Entomophilous plants, \*Pollination, Buckwheat plants.

A large number of scientific experiments and considerable progressive farming have demonstrated that pollination of flowers by bees is an effective and cheap biological means to improve the yields of entomophilous crops. The present book contains the results of the latest studies on the use of honeybees for increasing the yields of entomophilous crops and honey production through planned bee pollination. This volume of collected articles is of interest to workers in the fields of apiculture and plant cultivation, specialists, research workers, and amateur beekeepers.

**PB-263 349/3** **PC A07/MF A01**  
ACTION/Peace Corps, Washington, D.C. Information Collection and Exchange.

**Teaching Manual: School Gardens and Nutrition. (Manual Didactico: Huertos Escolares y Nutricion)**

Program and training journal reprint series.

Sep 76, 144p Rept no. Reprint Ser-18

Prepared by Peace Corps/Guatemala. Originally published by Ministerio de Educacion, Guatemala

City. Programa de Nutricion y Huertos Escolares para el Area Rural. Text in Spanish.

Descriptors: \*Health education, \*Nutrition, \*Horticulture, \*Hygiene, Public health, Manuals, Developing countries, Vegetables, Guatemala, Rural areas, Instructional materials.

Identifiers: Peace Corps volunteers, \*Gardens.

The report is a teachers manual covering school gardens, nutrition, and personal hygiene. It was originally intended for use by Peace Corps Volunteers working in rural primary schools in Guatemala.

**PB-263 350/1** **PC A05/MF A01**  
ACTION/Peace Corps, Washington, D.C. Office of Multilateral and Special Programs.

**Resources for Development: Organizations and Publications**

Program and training journal manual series.

Nov 76, 93p Rept no. Manual Ser-3A

Descriptors: \*Organizations, \*Social welfare, \*Project planning, International relations, Economic development, Businesses, Education, Specialized training, Developing countries, Labor unions, Rural areas, Technical assistance, Instructional materials, Children, Energy, Farms, Housing, Resources, Marketing, Family relations, United States, Africa, Asia, Latin America, Periodicals.

Identifiers: \*Peace Corps, Cooperatives.

The report was compiled to enable Peace Corps field workers to coordinate their efforts with those of other development agencies and organizations. Planning and implementing programs in conjunction with others will maximize efficiency, enhance Peace Corps contributions, and increase opportunities for learning.

**PB-263 399/8** **PC A19/MF A01**  
Texas A and M Univ., College Station. Dept. of Marine Resources Information.

**Proceedings of the Annual Tropical and Subtropical Fisheries Technological Conference (First) Held in Corpus Christi, Texas on March 8-10, 1976. Volume I**

Bryant F. III Cobb, and Alexandra B. Stockton.

Oct 76, 432p TAMU-SG-77-104, NOAA-

76122901

Grant NOAA-04-6-158-44012

Descriptors: \*Fisheries, \*Tropical regions, \*Meetings, Shellfish, Crustacea, Aquaculture, Marine biology, Biochemistry, Contamination, Biphenyl, Fresh water fishes, Marine fishes, Seafood, Hydrocarbons, Animal diseases, Shrimps, Reproduction(Biology), Animal physiology, Market research, Lobsters.

Identifiers: Sea Grant program, Biphenyl/chloro.

Volume I of the Proceedings of the First Annual Tropical and Subtropical Fisheries Technological Conference contains the following papers: The value of technology to the seafood industry; The FAO programme of cooperative research in tropical fish technology; The spoilage of fish in the tropics; Cellular aspects of reproduction in Penaeid shrimp; Texas A&M University shrimp mariculture program; Current status of the culture of river shrimps of the Genus macrobrachium; Chemical and nutritive composition of shrimp; Biochemistry and physiology of shrimp - effect on use as food; Cholesterol in crustacea; Water migration and dehydration in stored frozen breaded shrimp; International standardization of shrimp products - U.S. contribution; Bacteriology of shrimp; Time and temperature parameters for the destruction of Salmonella in cooked, peeled and deveined shrimp; Trace elements found in various species of shrimp harvested from selected areas; Polychlorinated biphenyls in shrimp; Analysis of petroleum hydrocarbon contamination in shrimp; Sodium bisulfite and its residual use in controlling blackspot in shrimp; Utilization of recovered shrimp protein as a pigment source for salmonids; and the status of the shrimping industry.

**PB-263 408/7** **PC A03/MF A01**  
Cornell Univ., Ithaca, N.Y. Center for Environmental Quality Management.



**Workshop on Research Methodologies for Studies of Energy, Food, Man and Environment**  
Final rept. on Phase 2  
David Pimentel, Walter R. Lynn, William K. MacReynolds, and Maxine Dattner. 11 Nov 74, 26p NSF/ERG-10  
Grant NSF-DEB74-21350  
See also PB-263 407.

Descriptors: \*Food supply, \*Energy, \*Farm crops, \*Meetings, Production, Output, Manpower, Construction, Fertilizers, Operating costs, Tables(Data), Pest control, Nutrition, Pollution, Social effect, Research, California.  
Identifiers: \*Energy consumption, \*Global.

This workshop was held to study further research methodologies for investigations of the interrelationships of energy, food, man and environment. The report from Phase I Workshop held June 18-19, 1974, was the prime focus of Phase II workshop. Workshop participants generally concluded that energy accounting aimed at energy and food production technologies is best accomplished by a form of process analysis. Crop output measured in the form of Kilocalories (Kcal) can be compared effectively by computing the energy inputs for each crop production process. Separate accounting for energy, labor, and land should be practiced, because within limits each of these factors can be substituted for the other. Increased energy used for both machinery construction and operating fuel can be substituted for labor, and energy used for increasing production per acre (fertilizer) can be substituted for land.

**PB-263 669/4** PC A02/MF A01  
Indo-Pacific Fisheries Council, Bangkok (Thailand).  
**The Technology and Economics of Small-Scale Commercial Prawn ('Macrobrachium rosenbergii') Hatcheries: A Case Study in Thailand**  
Occasional paper  
Cort W. Kloke, and Manu Potaros. May 75, 22p  
Rept no. IPFC-Occ.Pap.-1975/1  
See also PB-263 670.

Descriptors: \*Crustacea, \*Rivers, \*Economic analysis, \*Fisheries, \*Thailand, Shellfish, Demand(Economics), Aquaculture, Equipment, Manpower, Pumps, Foreign countries, Management, Water supply, Reproduction(Biology), Maintenance, Larvae, Cost analysis, Tables(Data), Feeding stuffs, Marketing, Developing countries.  
Identifiers: \*Macrobrachium rosenbergii.

Several small-scale private commercial and family operated prawn hatcheries have been established in Thailand to fill the demand for juveniles for culture, and the objective of this paper is to describe and comment on the practical operation and economic experience of two such commercial hatcheries so as to give those interested in the industry and potential prawn culturists some practical insights into the requirements, potentials and problems of hatchery operation. The paper takes the form of a case study with commentary and suggestions for improvement. It is divided into three sections; (1) actual technical description of each hatchery's operation, (2) economic analysis and (3) discussion and concluding observations.

**PB-263 670/2** PC A02/MF A01  
Indo-Pacific Fisheries Council, Bangkok (Thailand).  
**The Technology and Economics of Catfish ('Clarias spp.') Farming in Thailand**  
Occasional paper  
Cort W. Kloke, and Manu Potaros. Jun 75, 23p  
Rept no. IPFC-Occ.Pap.-1975/2  
See also PB-263 669.

Descriptors: \*Catfishes, \*Aquaculture, \*Thailand, Developing countries, Economic development, Food supply, Demand(Economics), Prices, Exports, Market research, Fresh water, Foreign countries.  
Identifiers: \*Clarias batrachus, \*Clarias macrocephalus.

The catfish species *Clarias batrachus* and *Clarias macrocephalus* are very popular table fish in Thailand. The two species make up almost 30% of Thailand's fresh-water production with *C. batrachus* (Pla duk dan) accounting for about 90% of that amount. Demand for both of these fish is very strong and growing rapidly despite their high price. *C. macrocephalus* is the preferred species for its appearance and eating qualities and commands a higher price particularly in what appears to be a lucrative export market. The report describes research on production, consumption, and economics.

**PB-263 671/0** PC A07/MF A01  
Indo-Pacific Fisheries Council, Bangkok (Thailand).  
**Preliminary Bibliography of Fish and Fisheries with Special Reference to Shrimps and Prawns**  
Occasional paper  
Agnes Jannet. Jul 75, 138p Rept no. IPFC-Occ.Pap.-1975/3  
See also PB-263 670 and PB-263 672.

Descriptors: \*Shrimps, \*Crustacea, \*Bibliographies, \*Thailand, Economic development, Aquaculture, Deep water, Ecology, Marine biology, Population(Statistics), Fishing, Foreign countries, Life cycles, Dehydration, Fresh water fish, Shellfish, Fisheries, Developing countries.

The bibliography includes research on aquaculture, fisheries, life cycles, ecology, fish diseases, equipment, fishing, and general studies.

**PB-263 672/8** PC A02/MF A01  
Indo-Pacific Fisheries Council, Bangkok (Thailand).  
**Aquaculture as an Integral Part of the Agricultural Farming System. A Case Study in the North-East of Thailand**  
Occasional paper  
Cort W. Kloke, and Manu Potaros. Jul 75, 15p  
Rept no. IPFC-Occ.Pap.-1975/4  
See also PB-263 671.

Descriptors: \*Aquaculture, \*Agriculture, \*Thailand, Developing countries, Maps, Municipalities, Farms, Boundaries, Economic development, Market research, Food supply, Foreign countries, Lagoons(Ponds), Farm crops, Statistical data, Fishes, Production, Social effect, Irrigation, Cost analysis, Income.

There is an increasing recognition and acceptance of the concept that development activities and efforts in the less developed countries of the world must be directed to the improvement of the income, security and standard of living of small low-income farmers, who constitute the vast bulk of the population of these countries. The practice of simple types of small-scale aquaculture offers excellent possibilities, particularly in Asia and the Far East, for helping to achieve the goals of diversification, increased cash incomes, improved quantity and quality of food produced for home consumption, and exploitation of un-utilized resources currently available to small farmers. Aquaculture is not new to the region, but it is not always recognized that its practice can be, and often is an integrated and natural part of the agricultural system with wide-spread involvement of small farmers. Just as most small farmers keep a few ducks and chickens to supplement their tables and their incomes, many more of them could operate a small managed fish pond.

**PB-263 840/1** PC A03/MF A01  
ACTION/Peace Corps, Washington, D.C. Information Collection and Exchange.  
**Improved Practices in Corn Production. A Guide for Peace Corps Volunteers**  
Program and training journal reprint series  
Dave Leonard. Mar 76, 50p Rept no. Reprint Ser-7  
Prepared by Peace Corps Training Center, Arecibo, Puerto Rico.

Descriptors: \*Corn plants, \*Agronomy, Production, Manuals, Yield, Seeds, Planting, Fertilizers, Insect control, Weed control, Storage, Shrinkage, Fungicides, Spacing, Tropical regions, Developing countries, Instructional materials.

Contents:  
Some handy conversions;

The 'package' approach to improving crop yields;  
Some important facts on corn;  
Use high yielding varieties;  
Select seed carefully for planting;  
Treat seeds with a fungicide;  
Improved plant populations and spacing;  
Use fertilizer;  
Control insects;  
Control weeds;  
Reduce storage losses.

**PB-263 849/2** PC A04/MF A01  
Puerto Rico Nuclear Center, Mayaguez.  
**A Method for the Cultivation of the Mangrove Oyster in Puerto Rico (Metodo para el Cultivo del Ostion de Mangle en P. R.)**  
Kenneth W. Watters, and Pedro Acosta Martinez. Jul 76, 45p NOAA-77010308  
Prepared in cooperation with Puerto Rico Dept. of Agriculture, Cabo Rojo. Lab. of Commercial Fisheries. Text in Spanish and English. Pub. in Agricultural and Fisheries Contributions, v8 n1 Jul 76.

Descriptors: \*Oysters, \*Aquaculture, \*Puerto Rico, Construction, Life cycles, Fishing, Harvesting, Seafood, Economic analysis, Maintenance, Reproduction(Biology), Swamps.  
Identifiers: Reprints, Oyster cultch, Commercial fishing, \*Rafts, Mangroves.

This paper describes the building and operation of oyster rafts in Puerto Rico. Basic information is given on the construction of the rafts and cultch plates, the emplacement of the rafts, the life cycle of the mangrove oyster, and harvesting and maintenance.

**PB-263 943/3** PC A23/MF A01  
Environmental Protection Agency, Washington, D.C. Office of Water Planning and Standards.  
**Quality Criteria for Water**  
Jul 76, 537p\* Rept no. EPA/440/9-76/023

Descriptors: \*Water pollution, \*Water quality, Hazardous materials, Public health, Standards, Government policies, State government, Revisions, Pesticides, Alkalinity, Ammonia, Arsenic, Barium, Beryllium, Boron, Cadmium, Chlorine, Coliform bacteria, Color, Hardness, Iron, Dissolved gases, Chromium, Copper, Lead(Metal), Mercury(Metal), Greases.  
Identifiers: \*Federal Water Pollution Control Act Amendments of 1972, \*Water pollution standards, \*Heavy metals.

The Federal Water Pollution Control Act Amendments of 1972 require the Administrator of the Environmental Protection Agency to publish criteria for water quality accurately reflecting the latest scientific knowledge on the kind and extent of all identifiable effects on health and welfare which may be expected from the presence of pollutants in any body of water, including ground water. Proposed Water Quality Criteria were developed and a notice of their availability was published on Oct 26, 1973 (38 FR 29646). This present volume represents a revision of the proposed water quality criteria based upon a consideration of comments received from other Federal agencies, State agencies, special interest groups and individual scientists. Standards and their criteria are given for over 54 chemicals.

**PB-264 014/2** PC A03/MF A01  
California Univ., Los Angeles. School of Engineering and Applied Science.  
**Conversion of Cattle Manure Into Useful Products**  
Final rept. Jan 74-May 75  
Bruce S. Dunn, John D. Mackenzie, and Eugene Tseng. Sep 76, 42p EPA/600/2-76/238  
Contract EPA-R-802933

Descriptors: \*Solid waste disposal, \*Agricultural wastes, \*Pyrolysis, \*Incinerators, \*Reclamation, Byproducts, Design, Carbon black, Fillers, Fertilizers, Cost analysis, Oils, Inks, Paints, Elastomers, Dehydration, Utilization, Process charting.  
Identifiers: \*Manure.

The purpose of the project was to design and build a pyrolysis apparatus for cattle manure and to in-



investigate the potential uses of the pyrolysis by-products. A pyrolysis machine of semi-continuous feed capabilities was designed and built. Various conditions of pyrolysis treatments were investigated and their influence on the amount and composition of the by-products determined. High carbon residues were found to require lower pyrolysis temperatures. The carbon content of these residues appeared to be unaffected by the geographic location of the original manure. Contact with interested parties and appropriate industries who could be prospective users of each of the products was initiated to obtain their technical expertise in evaluating these products. The pyrolysis by-products seem to have some potential industrial applications. These by-products include the solid residue, an oil fraction, and an aqueous fraction. The solid residue may serve as a carbon black substitute or as a filler material in rubber, ink, and paint. The aqueous fraction collected during pyrolysis has been evaluated for fertilizer applications.

**PB-264 015/9** PC A05/MF A01  
Council for Agricultural Science and Technology, Ames.  
**Application of Sewage Sludge to Cropland: Appraisal of Potential Hazards of the Heavy Metals to Plants and Animals**  
15 Nov 76, 77p 64, EPA/MCD-33

Descriptors: \*Sludge disposal, \*Farms, \*Metals, \*Livestock, Cadmium, Hazards, Ground water, Surface waters, Water pollution, Farm crops, Sewage, Water supply.  
Identifiers: \*Heavy metals.

This report examines the present state of knowledge regarding the potential effects on agricultural crops and animals by heavy metals in sewage sludges applied to cropland, as well as some consideration of possible groundwater and surface water contamination. Other potential effects associated with land application of sewage sludge are not addressed in detail.

**PB-264 170/2** PC A05/MF A01  
National Research Council, Washington, D.C. Board on Science and Technology for International Development.  
**Guayule: An Alternative Source of Natural Rubber**  
Final rept.  
Mar 77, 91p\* Rept no. CIR/BOSTID-77/22  
Contract BIA-K51C14200978, AID/csd-2584

Descriptors: \*Shrubs, \*Natural rubber, \*Deserts, Plants(Botany), Sources, Economic development, Production, Arid land, Farm crops, Employment, American Indians, Developing countries, Texas, New Mexico, Arizona, California, Agriculture, Financing, Quality, Extraction, North America.  
Identifiers: \*Guayule, \*Parthenium argentatum, Hevea brasiliensis.

The report describes a little-known bush that grows wild in deserts of North America and produces a rubber virtually identical with that from the rubber tree. It recommends funding for guayule development.

**PB-264 171/0** PC A10/MF A01  
National Research Council, Washington, D.C. Board on Science and Technology for International Development.  
**Resource Sensing from Space: Prospects for Developing Countries**  
Final rept.  
Mar 77, 210p Rept no. CIR/BOSTID-77/23  
Contract AID/csd-2584

Descriptors: \*Developing countries, \*Remote sensing, \*Technology transfer, Land use, International relations, Spaceborne photography, International government, Government policies, National government, Foreign countries, Reviewing.  
Identifiers: LANDSAT satellites.

This report examines current and prospective applications of interest to the developing countries, implications for long-term governance of a remote sensing system, and desirable technical cooperation initiatives. (Color illustrations reproduced in black and white.)

**PB-264 302/1** PC A03/MF A01  
Environmental Science and Engineering, Inc., Gainesville, Fla.  
**Background Document: Bagasse Combustion in Sugar Mills**  
Robert Baker, and Thomas F. Lahre. Jan 77, 45p  
EPA/450/3-77/007  
Contract EPA-68-02-1402  
See also PB-223 996.

Descriptors: \*Bagasse, \*Air pollution, Industrial plants, Scrubbers, Sugarcane, Physical properties, Process charting, Combustion products, Furnaces, Design criteria, Particle size distributions, Fuels, Cyclone separators, Concentration(Composition), Flue gases, Air pollution control equipment, Industrial wastes, Nitrogen oxides, Boilers, Sulfur dioxide.  
Identifiers: Refuse derived fuels, Wet methods, \*Emission factors.

This is a background document in support of the contents of Section 1.8 of AP-2, Compilation of Air Pollutant Emission Factors, Second Edition. It concerns the major criteria pollutants emitted during the combustion of bagasse (a fibrous waste product in a sugar cane mill) in steam boilers. The general aspects of mill operations, physical characteristics of the bagasse and its combustion, furnace designs, air pollution control devices and factors affecting emissions are described. Stack emission tests are reviewed and analyzed for inclusion in the data base for developing factors for particulate and NOx emission while firing bagasse or bagasse and fuel oil. The reliability of these factors is evaluated and presented.

**PB-264 457/3** PC A06/MF A01  
National Research Council, Washington, D.C. Committee on Renewable Resources for Industrial Materials.  
**Biological Productivity of Renewable Resources Used as Industrial Materials**  
James S. Bethel. 1976, 112p\* NSF/PRA-7501069/3/7  
Contract NSF-STP75-01069  
See also report dated Sep 76, PB-257 357.

Descriptors: \*Natural resources, \*Forestry, \*Agriculture, \*Energy conservation, Cellulose resins, Forecasting, Economics, Performance evaluation, Ethylene, Vegetable oils, Flax plants, Cotton plants, Industrial plants, Biomass, Polymers, Environmental impacts, Utilization, Wood products, Structural timber, Byproducts, Leather, Farm crops, Industrial plants, Soybean plants, Production management, Assessments.  
Identifiers: \*Renewable resources, Fuel substitution.

The report estimates the biological productivity of industrial renewable resources in terms of current yields, existing land bases, and increments to these bases that may reasonably be forecast by 1985 and 2000. The forecast divides naturally into two parts: the silvicultural product of wood, and products for industry from agriculture consisting chiefly of vegetable fibers, oil seeds, wool, animal fats, tallow, and hides. Wood is not only by far the most important renewable resource used for industrial materials, but also one whose production can be greatly increased if needed. Agricultural products include cotton and other vegetable fibers. Furthermore, there is little reason to believe that market demand will strain biological potential by 1985 or 2000. Under these conditions, long-term estimates of productivity become a mere exercise in imagination. Consideration is made of the energy requirements and environmental impacts associated with the implementation of the recommendations on these renewable resources.

**PB-264 459/9** PC A04/MF A01  
National Research Council, Washington, D.C. Committee on Renewable Resources for Industrial Materials.  
**Extractives as a Renewable Resource for Industrial Materials**  
James S. Bethel. 1976, 74p\* NSF/PRA-7501069/5/7  
Contract NSF-STP75-01069  
See also report dated Sep 76, PB-257 357.

Descriptors: \*Organic compounds, \*Energy conservation, \*Extractives, \*Natural resources, Byproducts, Wood products, Leather, Forestry, Agriculture, Bark, Economics, Cost estimates, Residues, Vegetable oils, Tallow, Fats, Oils, Marine biology, Fuels, Industrial wastes, Utilization, Forecasting, Water pollution control, Waste treatment, Materials recovery, Aquatic plants, Polymers, Plastics, Petrochemistry.  
Identifiers: Renewable sources, Naval stores, Fuel substitution.

Extractives from plants and animals are used to varying degrees in manufacturing processes of industrial goods. Bark, oleoresin, waxes, oils and fats, and tallow are covered in this report. These products are derived from forest, agricultural and marine sources. Consideration of the energy requirements and environmental impacts associated with the implementation of the recommendations are included in this report.

**PB-264 561/2** PC A12/MF A01  
National Research Council, Washington, D.C. Committee on Renewable Resources for Industrial Materials.  
**Fibers as Renewable Resources for Industrial Materials**  
James S. Bethel. 1976, 271p\* NSF/PRA-7501069-7-7  
Contract NSF-STP75-01069  
See also PB-257 357.

Descriptors: \*Natural fibers, \*Energy conservation, \*Environmental impacts, Assessments, Cost estimates, Economics, Paper industry, Textile industry, Plants(Botany), Fiber crops, Cotton plants, Wool, Hair, Cellulosic resins, Synthetic fibers, Leather, Feathers, Performance evaluation, Forecasting, Supply management, Paperboards, Forestry, Law enforcement, Water pollution, Air pollution, Utilization, Byproducts.  
Identifiers: Renewable resources.

Contents:  
The pulp, paper and paperboard industry introduction--(Assessment of the industry, some factors affecting the industry, enhancement of availability and utility of materials with reduction in costs, enhanced role of renewable fiber resources - an overview of product substitution, identification of educational roles and needs, and recommended research, its costs and returns, and time schedules);  
Plant fibers other than wood and cotton;  
The textile industry--(Cotton, wool and mohair, the cellulose and synthetic fibers);  
Feathers, furs and leather.

**PB-264 594/3** PC A13/MF A01  
Texas A and M Univ., College Station. Dept. of Marine Resources Information.  
**Proceedings of the Annual Tropical and Subtropical Fisheries Technological Conference (First) Held in Corpus Christi, Texas on March 8-10, 1976. Volume II**  
Bryant F. III Cobb, and Alexandra B. Stockton.  
Oct 76, 277p TAMU-SG-77-105, NOAA-77010401  
Grant NOAA-04-6-158-44012  
See also Volume 1, PB-263 399.

Descriptors: \*Fisheries, \*Fishes, \*Shellfish, \*Meetings, Tropical regions, Lipids Metabolism, Catfishes, Feeding stuffs, Meat, Food processing, Mexico Gulf, Cod, Fresh water fishes, Crabs, Economic development, Market research, Lobsters, Aquaculture.  
Identifiers: Sea Grant program, Subtropical regions.

This collection of 18 papers constitutes the second volume of the Proceedings of the Tropical and Subtropical Fisheries Technological Conference held March 8-10, 1976 at Corpus Christi, Texas. Titles included are: Transfer of Lipids through marine food chains; Lipid metabolism in Channel Catfish; Flavor problems in fish culture; Organoleptic and biochemical comparisons of cage raised and wild Striped Mullet; Utilization of insects as complementary diet in Channel Catfish feeding; Utilization of small mullet by a cold smok-



ing process; Potential Demersal Fish fisheries in the Northwest Gulf of Mexico; Notes on the underutilized fishery resources of the Gulf of Mexico; Salt minced cod; Yield and quality of mechanically separated flesh from several species of cultured freshwater fish; The effect of washing on color and texture of minced croaker; Functional properties influencing texture; Selected textural properties of cooked minced Atlantic Cutlass fish sticks; Roller extraction of crab meat; The economics of the commercial development of Gulf of Mexico bottomfish; Market potential for fish as an extender in meat products; An economic analysis of effort and yield in the Florida Spiny Lobster industry; and Publicly supported seafood product development research.

**PB-264 638/8** PC A06/MF A01  
Development Planning and Research Associates, Inc., Manhattan, Kans.  
**Feasibility of a Beef Processing Plant on the Blackfeet Indian Reservation**  
Nov 76, 103p P-192, EDA-77-054  
Grant EDA-05-06-01520

Descriptors: \*Economic development, \*American Indians, Regional planning, Rural areas, Industrial plants, Meat, Processing, Economic analysis.  
Identifiers: Technical assistance project, Blackfeet Indians, Indian reservations, Meat packing plants.

The study gives an analysis of a proposed beef packing plant with respect to markets and raw material supplies. The plant would be situated in an area of large surpluses of both livestock feed and calf supplies. It would be necessary to tie the packing plant to a feedlot. Ownership of both enterprises was to be integrated and the purpose of the feedyard was to even slaughter cattle supplies to the packing plant. Both locker-type plants and commercial plants are to be constructed. The Blackfeet Tribe in searching for development possibilities for their tribally controlled acres on the Reservation proposes to investigate the establishment of a beef packing plant.

**PB-264 738/6** PC A03  
South Carolina Wildlife and Marine Resources Dept., Charleston. Marine Resources Research Inst.  
**Pond Culture of the Malaysian Prawn, 'Macrobrachium rosenbergii' (de Man), in South Carolina, 1974-1975**  
Theodore I. J. Smith, Paul A. Sandifer, and William C. Trimble. 1976, 26p Contrib-53, NOAA-77011711  
Grant NOAA-04-5-158-5, NOAA-04-6-158-44009  
Sponsored in part by Coastal Plains Regional Commission, Washington, D.C. Pub. in Proceedings of Annual Meeting (7th), World Mariculture Society, San Diego, Calif. 25-29 Jan 76 p625-645 1976. (Pub. by Louisiana State Univ., Baton Rouge, La..

Descriptors: \*Ponds, \*Crustacea, \*Aquaculture, Mortality, Feasibility, Growth, Survival, Yield, Management, Earth fills, South Carolina.  
Identifiers: Sea Grant program, \*Macrobrachium rosenbergii, Mariculture.

The feasibility of growing *Macrobrachium rosenbergii* commercially in ponds is under investigation in South Carolina. Results of 1974 and 1975 pond studies indicate a favorable outlook for eventual commercial production. Excellent growth and survival rates were obtained under conditions which were considered marginal at times. Considerable production was achieved even when newly metamorphosed postlarvae were stocked into ponds. However, increased production and greater final prawn size resulted when larger juveniles were stocked. Higher yields are anticipated from more suitable ponds and as better pond management techniques are developed and applied.

**PB-264 900/2** PC A06/MF A01  
Ohio State Univ., Columbus. Dept. of Civil Engineering.  
**A Study of Runoff from Small Rural Watersheds in Response to Completed and Proposed Land Use Changes**  
Master's thesis

Michael Joseph Smith. 1972, 115p OWRT-B-005-OHIO(13)

Descriptors: \*Hydrology, \*Land use, \*Runoff, \*Watersheds, Strip mining, Agriculture, Water quality management, Industrial waste treatment, Theses, Upgrading, Sewage treatment, Tables(Data), Ohio.  
Identifiers: \*Agricultural watersheds, \*Cumberland Plateau, \*Allegheny Plateau.

The thesis pertains to the effect of land use and management upon the hydrology and water quality of two experimental watersheds; one, an agricultural area containing remnants of strip mining operations, and the other, a mixed cover agricultural watershed about to be subjected to a sharp upgrading of treatment. The analysis techniques used illustrate some procedures for determining changes in watershed hydrology. A longer period of study is recommended to make positive statements regarding changes in hydrologic response.

**PB-265 105/7** PC A06/MF A01  
Maryland Univ., College Park. Agricultural Experiment Station.  
**Solar Energy Applications in Agriculture: Potential, Research Needs, and Adoption Strategies**  
Filmore E. Bender, Andrew M. Cowan, Richard W. Dillon, James D. Hansford, Jr., and David A. Hurd. Jan 76, 119 A-184, NSF/RA-760021  
Contract USDA-12-14-1605-106, NSF-PTP75-10573  
See also PB-255 928.

Descriptors: \*Agriculture, \*Solar heating, Solar drying, Solar space heating, Irrigation, Farm crops, Farm buildings, Greenhouses, Natural gas, Liquefied petroleum gas, Electricity, Fuel oils, Kerosene, Coal, Prices, Economic analysis, Recommendations.

Objectives pursued in this study are: (1) assessment of present agricultural operations to determine those with potential for use with solar energy; (2) development of recommendations for an overall experimental research program to establish the technical and economic feasibility of using solar energy in agricultural operations; and (3) formulation of recommendations for strategies to achieve adoption of solar energy components and systems in agriculture. Applications of solar energy to the following aspects of agriculture are examined: grain drying, tobacco curing, peanut drying, broiler housing, swine production, farm housing, greenhouses, and irrigation. Current fuel prices for each of the agricultural regions (determined by crop production) are also reviewed.

**PB-265 159/4** PC A06/MF A01  
Saint John's Univ., Jamaica, N.J.  
**A System for the Analysis, Evaluation and Design of Organizations, Work, and Jobs**  
Final rept.  
Charles W. Lachenmeyer. 1977, 115p EDA/OER-77/006  
Grant EDA-PF-528, EDA-99-7-13336

Descriptors: \*Job analysis, \*Organization theory, Position(Title), Productivity, Personnel management, Management systems, Qualifications, Performance, Motivation, Technology innovation, Supervision, Manpower utilization, Job satisfaction, Design.

This report is in three parts. The Introduction catalogues the necessary components of a theory of the design of jobs and organizations. Part I of the report presents the job analytic system in detail. To maximize the transferability it is in the form of an ordered series of questions. When applied to a job situation, in total, the results will be the complete analysis of that situation, including the description of the jobs as they exist, the evaluation of the performance of workers in those jobs, the assessment of the adequacy of the jobs as structured, the assessment of the relations between those jobs and the adequacy of those relations within the organization, and finally, the generation of all the possible changes in the jobs with their anticipated outcomes, problems, etc. Part II of the report contrasts the advantages of this system with the disadvantages of previous efforts. With respect to the

latter, two bodies of research and theory are reviewed exhaustively: job design, including job enrichment, job development, etc.; and job analysis. Part II can be read as a self-contained critical review of work in this area.

**PB-265 161/0** PC A09/MF A01  
National Research Council, Washington, D.C. Board on Science and Technology for International Development.  
**Making Aquatic Weeds Useful: Some Perspectives for Developing Countries**  
Survey rept.  
1976, 184p\*  
Contract AID/csd-2584

Descriptors: \*Aquatic weeds, \*Weed control, \*Developing countries, Wildlife, Utilization, Food supply, Management, Feeding stuffs, Sewage treatment, Livestock, Fishes, Cutting, Dewatering, Ruminants, Food consumption, Aquatic animals, Inland waterways, Fertilizers, Grasses, Tropical regions, Mammals.  
Identifiers: \*Trichechus, Herbivores.

This report examines methods for controlling aquatic weeds and using them to best advantage, especially those methods that show promise for less-developed countries. It emphasizes techniques for converting weeds for feed, food, fertilizer, and energy production. It examines, for example, biological control techniques in which herbivorous tropical animals (fish, waterfowl, rodents, and other mammals) convert the troublesome plants directly to meat. Though the techniques described in this report have been selected for their applicability in less-developed countries, many are relevant to industrialized countries. Both types of country face a future in which food production will need to depend more and more on the effective management of natural systems, such as waterways.

**PB-265 237/8** PC A03/MF A01  
Western Forest Products Lab., Vancouver (British Columbia).  
**Lathe Operators' Manual. Part II. Pressure Bars. Their Operation and Maintenance**  
Information rept.  
W. V. Hancock, and O. Feihl. Oct 76, 39p\* Rept no. VP-X-158  
See also PB-240 534.

Descriptors: \*Lathes, \*Manuals, Woodworking machinery, Veneers, Peeling, Plywood, Rollers, Bars, Setting(Adjusting), Canada.  
Identifiers: Pressure bars.

The development, design and operation of various types of pressure bars for veneer lathes is discussed in detail. The importance is stressed of a high level of maintenance and of accurate adjustment of the various lathe settings. The techniques for setting a veneer lathe are given together with a description of the special instrumentation that has been developed for this purpose.

**PB-265 357/4** PC A04/MF A01  
Snokist Growers, Yakima, Wash.  
**Fruit Cannery Waste Activated Sludge as a Cattle Feed Ingredient**  
Larry A. Esvelt. Sep 76, 66p EPA/600/2-76/253  
Grant EPA-S-803307  
Prepared by Bovay Engineers, Inc., Spokane, Wash.

Descriptors: \*Materials recovery, \*Food processing, \*Feeding stuffs, \*Activated sludge process, \*Canneries, Feasibility, Animal nutrition, Byproducts, Fruits, Industrial waste treatment, Dewatering, Beef cattle, Centrifuging, Water pollution control, Nutrients, Process charting, Performance evaluation.  
Identifiers: \*Solid waste disposal.

The feasibility of sludge disposal, from a fruit processing waste activated sludge treatment system, by dewatering and using the dewatered biological sludge solids as cattle feed was evaluated by Snokist Growers at Yakima, Washington. Dewatering of the biological sludge utilizing pilot-scale and prototype-scale basket centrifuges resulted in consistently dewatering to 7-1/2% to 9% dry solids.



Digestibility and metabolizability of rations containing 2.3% and 4.5% biological solids appeared equal to a control ration, but a ration containing 9.2% biological solids appeared lower. Twenty-four uniform yearling steers were divided into four lots of six each and finish fed a control ration and rations containing 2.3%, 4.6%, and 8.9% sludge solids on a dry matter basis for 165 days. They did not show any adverse effects of the sludge incorporation into their rations. It appeared that a low quantity of sludge (2.3% dry solids) actually enhanced the weight gain performance and carcass quality of these animals. The cost of a dewatering installation will require that the canney receive remuneration for use of the waste activated sludge as cattle feed in order to make a full-scale dewatering project feasible. The calculated value of the biological solids incorporated into the rations was in the range of \$0.092 to \$0.148 per kg dry solids.

**PB-265 749/2** **PC A06/MF A01**  
North Dakota State Univ., Fargo. Dept. of Agricultural Economics.  
**The Economic Feasibility of Establishing Oil Sunflower Processing Plants in North Dakota**  
Delmer L. Helgeson, David W. Cobia, Randal C. Coon, Wallace C. Hardie, and LeRoy W. Schaffner. Apr 77, 110p Bull-503, EDA-77-080  
Grant EDA-05-06-01485  
Errata sheet inserted.

Descriptors: \*Economic development, \*Oilseed crops, \*Food processing, Flax plants, Manufacturing, Economic impact, Feasibility, Marketing, Objectives, Technical assistance, Variable costs, Prices, North Dakota.  
Identifiers: \*Sunflower plants.

The purpose of this report was to explore the economic feasibility of establishing processing facilities for oil-type sunflowers in North Dakota. A broad set of topics was covered because production, processing and marketing of sunflowers and sunflower products in the U.S. are relatively recent. Historical sunflower production patterns were presented, together with two estimates of future production. One estimate was based on an attitudinal survey of farmers and a second on a maximum long-run projection for North Dakota. The supply of whole seed sunflowers from current and the two projections was related to processing requirements for each of the four plant sizes. The economic impact of each of the model sunflower processing plants on multicounty regions in which they might locate was estimated for the construction and operational phases.

**PB-265 823/5** **PC A02/MF A01**  
Federal Energy Administration, Washington, D.C. Office of Coal, Nuclear, and Electric Power Analysis.  
**Wind Energy Conversion Systems Manufacturing and Sales Activity, 1975 and 1976**  
Norbert Parker, and Howard Walton. Apr 77, 11p Rept no. FEA/B-77/121

Descriptors: \*Windpowered generators, \*Windmills, \*Windpowered pumps, \*Market research, Wind power generation, Electric power generation, Well pumps, Manufacturing, Sales, Economic surveys.

This report contains the results of an annual survey of private firms engaged in the manufacturing and distribution of wind energy conversion systems in the United States during the years 1975 and 1976. Imports of systems manufactured abroad for distribution in the United States are also included.

**PB-265 918/3** **PC A02**  
Puerto Rico Nuclear Center, Mayaguez. Radioecology Div.  
**Culture of the Mangrove Oyster, 'Crassostrea rhizophorae' Guilding, in Puerto Rico**  
Kenneth W. Watters, and Thomas E. Prinslow. Jan 77, 17p NOAA-77031510  
Pub. in Proceedings of Annual Workshop World Mariculture Society (6th), at Seattle, Washington, on January 27-31, 1975.

Descriptors: \*Oysters, \*Aquaculture, \*Puerto Rico, Feasibility, Estuaries, Swamps, Salinity, Temperature, Lagoons(Ponds), Harvesting, Growth.  
Identifiers: \*Crassostrea rhizophorae, Reprints, Oyster clutch.

Experiments to determine commercial feasibility of mangrove oyster culture in Puerto Rico have been underway since early 1973. Most of the work has been carried out in Rincon Lagoon, a rich mangrove-lined estuary subject to periodic salinity fluctuations. The bulk of commercial oyster harvesting on the island is presently carried out in this lagoon. A revised method of culturing, consisting of 46 x 71 cm frames suspended from rafts, was used. The frames, utilizing several materials such as concrete-coated plywood and plastic sheeting showed sustained mean growth rates of 0.7 mm per day, with maximum individual rates of 1.4 mm per day. A program monitoring spatfall, salinity, and temperature was carried out in an effort to determine the timing of natural spatfall in the lagoon. It appeared that spatfall closely followed drops in salinity.

**PB-266 205/4** **PC A06/MF A01**  
American Inst. of Biological Sciences, Arlington, Va.  
**Analysis of Specialized Pesticide Problems Invertebrate Control Agents - Efficacy Test Methods. Volume III. General Soil Treatments**  
Mahlon Fairchild, Christian C. Burkhardt, J. Marshall Magner, William Campbell, and Gerald Musick. Jan 77, 106p\* EPA/540/10-77/007  
Contract EPA-68-01-2457  
See also Volume 2, PB-266 204.  
Also available in set of 8 reports PC E14, PB-266 202-SET.

Descriptors: \*Insecticides, \*Pesticides, \*Soils, \*Vegetable crops, \*Corn plants, \*Peanut plants, \*Tobacco plants, \*Sugar crops, \*Pest control, Methodology, Effectiveness, Tests, Insect control, Insects, Parasites, Evaluation, Dosage.

The testing of soil insecticides for efficacy is extremely complex and it would be impossible to put together guidelines for all soil insecticides; therefore, an attempt has been made to pull together some test methods for major pests on a few commodities. The commodities selected are corn, vegetables, sugarbeets, peanuts and tobacco. It would be impossible to cover all pests that might require soil insecticides under each of the commodities chosen.

**PB-266 300/3** **PC A06/MF A01**  
ACTION/Peace Corps, Washington, D.C.  
**The Photonovel: A Tool for Development**  
Program and training journal manual series  
Daniel Weak, and Eliza Sola. Sep 76, 113p Rept no. Manual Ser-4

Descriptors: \*Public health, \*Specialized training, \*Documents, \*Health education, Manuals, Toilet facilities, Construction, Developing countries, Rural areas, Populations, Photographs, Instructions, Information, Materials, Methodology, Ecuador.  
Identifiers: \*Photonovels, Rural populations, Developing countries, Peace Corps.

Since 1961 Peace Corps volunteers have worked at the grass roots level in developing countries to help peoples to use new ideas that utilize locally available resources. One approach that has proven effective is the photonovel, in which a series of pictures outlines a step by step process to achieve a community goal. In each picture a white 'balloon' contains dialogue and indicates the speaker. The photonovel has achieved results where other media have failed. The present material deals with sanitary facilities in Ecuador.

**PB-266 332/6** **PC A03/MF A01**  
National Bureau of Standards, Washington, D.C. Center for Building Technology.  
**Building to Resist the Effect of Wind. Volume I. Overview**  
Building science series (Final)  
N. J. Raufaste, R. D. Marshall, and S. A. Kliment. May 77, 38p Rept no. NBS-BSS-100-1

Library of Congress catalog card no. 77-600013.  
Prepared in cooperation with Kliment (Stephen A.), New York.  
Also available in set of 5 reports PC E08, PB-266 331-SET.

Descriptors: \*Residential buildings, \*Wind pressure, Design criteria, Disasters, Construction materials, Construction management, Socioeconomic status, Technology transfer, Bangladesh, Philippines, Jamaica, Developing countries.  
Identifiers: Low rise buildings, Wind resistant structures.

This document presents the background, goals, procedures and results of a project to develop improved design criteria that would make low-rise buildings in developing countries better able to withstand the effects of extreme winds. The project stemmed from the belief that additional research on wind was needed to reduce loss of life and property, human suffering, disruption of productive capacity and costs of disaster relief. The 3 1/2 year project began in early 1973 and produced these results: the development of improved design criteria; a methodology for the estimation of extreme wind speeds; the development of wind tunnel modeling techniques; a heightened awareness of the wind problem and the need to guard against it; the emergence of useful working relationships between NBS/AID and public and private decision makers in developing countries subject to extreme winds, especially the Philippines, Jamaica and Bangladesh; and the documentation of important information in the areas of wind design speeds and pressure coefficients, economic forecasting, socio-economic and architectural concerns, and construction detailing practices. Also during the project, a program began in the training of professionals and technicians in developing countries to carry out wind measurements and analyses. In addition, methods to ensure transfer of information to user groups were employed.

**PB-266 333/4** **PC A03/MF A01**  
National Bureau of Standards, Washington, D.C. Center for Building Technology.  
**Building to Resist the Effect of Wind. Volume II. Estimation of Extreme Wind Speeds and Guide to the Determination of Wind Forces**  
Final rept. 1975  
R. D. Marshall. Jul 75, 33p Rept no. NBS-BSS-100-2  
Grant PASA-TA(CE)-04-73  
Prepared in cooperation with Kliment (Stephen A.), New York. Library of Congress catalog card no. 77-600013. See also Volume 1, PB-266 332.  
Also available in set of 5 reports PC E08, PB-266 331-SET.

Descriptors: \*Residential buildings, \*Wind pressure, Design criteria, Disasters, Construction materials, Construction management, Socioeconomic status, Technology transfer, Bangladesh, Philippines, Jamaica, Developing countries.  
Identifiers: Low rise buildings, Wind resistant structures.

This paper briefly describes some of the more common flow mechanisms which create wind pressures on low-rise buildings and the effects of building geometry on these pressures. It is assumed that the basic wind speeds are known and a procedure is outlined for calculating design wind speeds which incorporates the expected life of the structure, the mean recurrence interval, and the wind speed averaging time. Pressure coefficients are tabulated for various height-to-width ratios and roof slopes. The steps required to calculate pressures and total drag and uplift forces are summarized and an illustrative example is presented.

**PB-266 334/2** **PC A04/MF A01**  
National Bureau of Standards, Washington, D.C. Center for Building Technology.  
**Building to Resist the Effect of Wind. Volume III. A Guide for Improved Masonry and Timber Connections in Buildings**  
Building science series (Final) 1976  
S. George Fattal, G. E. Sherwood, and T. L. Wilkinson. May 77, 60p Rept no. NBS-BSS-100-3  
Grant PASA-TA(CE)-04-73



Prepared in cooperation with Forest Products Lab., Madison, Wis. Library of Congress catalog card no. 77-600013. See also Volume 2, PB-266 333. Also available in set of 5 reports PC E08, PB-266 331-SET.

**Descriptors:** \*Residential buildings, \*Wind pressure, Design criteria, Disasters, Construction materials, Construction management, Socioeconomic status, Technology transfer, Bangladesh, Philippines, Jamaica, Developing countries.  
**Identifiers:** Low rise buildings, Wind resistant structures.

This report investigates the use of connectors for masonry and timber elements in low-rise buildings. Connector characteristics and construction details that improve a building's response to extreme wind effects are given primary emphasis. Recommendations include improvements through better utilization of connector technology showing good feasibility of introduction in developing countries. The building systems considered in this study fall within the low to moderate cost category.

**PB-266 335/9** **PC A03/MF A01**  
National Bureau of Standards, Washington, D.C. Center for Building Technology.  
**Building to Resist the Effect of Wind. Volume IV. Forecasting the Economics of Housing Needs: A Methodological Guide**  
Building science series (Final) 1976  
Joseph G. Kowalski. May 77, 40p Rept no. NBS-BSS-100-4  
Grant PASA-TA(CE)-04-73  
Library of Congress catalog card no. 77-600013. See also Volume 3, PB-266 334.  
Also available in set of 5 reports PC E08, PB-266 331-SET.

**Descriptors:** \*Residential buildings, \*Wind pressure, Design criteria, Disasters, Construction materials, Construction management, Socioeconomic status, Technology transfer, Bangladesh, Philippines, Jamaica, Developing countries.  
**Identifiers:** Low rise buildings, Wind resistant structures.

The Agency for International Development sponsored with the NBS, a 3 1/2 year research project to develop improved design criteria for low-rise buildings to better resist the effects of extreme winds. Housing is probably the single most important consumer good in most economies. Measuring the size of a region's unmet housing need is a first step to planning and implementing improvements in housing conditions. This report analyzes the concept of housing needs in an economic framework. A methodology for estimating and projecting housing needs at the regional level is developed. The methodology attempts to make explicit the income redistribution intent which is the core meaning behind the concept of housing needs. Project results are presented in five volumes. Volume 1 gives an overview of the research activities, accomplishments, results and recommendations. Volume 2 presents a methodology to estimate design wind speeds and a guide to determine wind forces. Volume 3 discusses a guide for improved use of masonry fasteners and timber connectors. Volume 4 furnishes a methodology to estimate and forecast housing needs at a regional level. Socio-economic and architectural considerations of the Philippines, Jamaica and Bangladesh are presented in Volume 5.

**PB-266 336/7** **PC A03/MF A01**  
National Bureau of Standards, Washington, D.C. Center for Building Technology.  
**Building to Resist the Effect of Wind. Volume V. Housing in Extreme Winds: Socio-economic and Architectural Considerations**  
Building science series (Final) 1976  
Stephen A. Kliment. May 77, 41p Rept no. NBS-BSS-100-5  
Grant PASA-TA(CE)-04-73  
Prepared by Kliment (Stephen A.), New York. Library of Congress catalog card no. 77-600013. See also Volume 4, PB-266 335.

**Descriptors:** \*Residential buildings, \*Wind pressure, Design criteria, Disasters, Construction materials, Construction management, Socioeconomic

status, Technology transfer, Bangladesh, Philippines, Jamaica, Developing countries.  
**Identifiers:** Low rise buildings, Wind resistant structures.

Typical socio-economic conditions in the Philippines, Jamaica, and Bangladesh are identified. These conditions include strong respect for traditional materials and methods of house construction, and suspicion of innovative forms and approaches; a rising proportion of urban poor who live in squatter settlements; and a rising ratio of inhabitants whose incomes are at a level where they cannot afford housing of any kind. The importance of land from a social standpoint is stressed. The report reviews the sites and services concept whereby low income persons are provided a site equipped with basic utilities but must erect and maintain a house upon it. Recommendations include: placement of buildings to exploit terrain; adherence to good practices in the configurations of the main elements of a house (these are shown by means of simple drawings); and use of cheap, strong and locally available materials.

**PB-266 709/5** **PC A02/MF A01**  
New Mexico State Univ., University Park. Water Resources Research Inst.  
**Protein Production by Russian Thistle: Effects of Water and Nitrogen on Protein Yields**  
Technical completion rept.  
James H. Hageman, and James L. Fowler. Mar 77, 20p WRRI-085. OWRT-A-049-NMEX(2)  
Contract DI-14-34-0001-6032  
Prepared by New Mexico State Univ., University Park. Dept. of Chemistry.

**Descriptors:** \*Feeding stuffs, \*Proteins, \*Forage crops, \*Water consumption, Droughts, Arid land, Yield, Toxic tolerances, Inorganic salts, Irrigation, Efficiency, Nutrients, Vegetation, Acclimatization, New Mexico.  
**Identifiers:** \*Salsola, \*Water use.

The purpose was to determine whether Russian thistle (*Salsola* spp.) might have potential as either a protein source or a forage under conditions of restricted water. *Salsola* was chosen because it was reported to be a C4 plant which is efficient in water use, drought resistant, salt tolerant and because it had been used as a feed previously. These results compare favorably with alfalfa, which is the most widely grown forage in New Mexico.

**PB-267 262/4** **PC A17/MF A01**  
Lyon Associates, Inc., Baltimore, Md.  
**Laterite and Lateritic Soils and Other Problem Soils of the Tropics. Volume I**  
W. J. Morin, and Peter C. Todor. 1975, 376p\*  
AID/csd-3682-Vol-1  
See also Volume 2, PB-267 263.

**Descriptors:** \*Soil mechanics, \*Tropical regions, \*Laterites, Weathering, Geology, Volcanic ejecta, Soil tests, Clay soils, Standards, Flexible pavements, Gravel, Photointerpretation, Roads, Design, Specifications, Geography, Soil stabilization, Soil classification.

The report documents five years of worldwide research resulting in the following useful information for engineers: (1) Comprehensive descriptions of tropical soils, chemical mineralogical and physical properties and engineering behaviors, and appropriate classifications; (2) A new pavement design procedure developed for tropical applications; (3) A practical range of strength values attainable through stabilization; (4) Specifications for common tropical materials; (5) Methods of working and using problem soils such as black clay and volcanic soils.

**PB-267 263/2** **PC A05/MF A01**  
Lyon Associates, Inc., Baltimore, Md.  
**Latherite and Lateritic Soils and Other Problem Soils of the Tropics. Volume II. Instruction Manual**  
W. J. Morin, and Peter C. Todor. 1975, 96p\*  
AID/csd-3682-Vol-2  
See also Volume 1, PB-267 262.

**Descriptors:** \*Soil mechanics, \*Tropical regions, \*Laterites, \*Manuals, Weathering, Laboratory tests, Field tests, Flexible pavements, Soil properties, Clay soils, Volcanic ejecta, Design criteria, Roads, Specifications, Roadbeds.

The report documents five years of worldwide research resulting in the following useful information for engineers: (1) Comprehensive descriptions of tropical soils, chemical mineralogical and physical properties and engineering behaviors, and appropriate classifications; (2) A new pavement design procedure developed for tropical applications; (3) A practical range of strength values attainable through stabilization; (4) Specifications for common tropical materials; (5) Methods of working and using problem soils such as black clay and volcanic soils.

**PB-267 295/4** **PC A06/MF A01**  
Missouri Univ.-Rolla. Rock Mechanics and Explosives Research Center.  
**Rapid Excavation of Rock with Small Charges of High Explosives**  
Final rept.  
George B. Clark, and Ronald R. Rollins. Nov 76, 121p BuMines-OFR-98-77  
Contract H0252052

**Descriptors:** \*Tunneling, \*Underground mining, \*Blasting, Explosive charges, Blast loads, Detonators, Earth movement, Fragmentation.  
**Identifiers:** \*Rapid excavation, Air blast.

The purpose of this investigation was to determine the feasibility of designing and testing the elements of a small-charge blasting system that will eliminate, or reduce to acceptable levels, most of the undesirable features of current underground drill and blast systems, that is, (1) air blast, (2) ground vibrations, (3) flying fragments, (4) over-break and fracture of surrounding rock, and (5) the cyclic nature of drill and blast operations. The experimentation was conducted in tunnels in granite, and the results indicated that the basic technical concepts of the project were achieved. The next step is to design, construct, and test a prototype machine.

**PB-267 358/0** **PC A02/MF A01**  
National Inst. for Occupational Safety and Health, Cincinnati, Ohio. Div. of Technical Services.  
**Good Work Practices for Tannery Workers**  
Apr 76, 25p Rept no. NIOSH-76/157

**Descriptors:** \*Industrial hygiene, \*Tanning materials, Safety, Hazards, Methodology, Chemical compounds, Accident prevention, Recommendations, Personnel management, Leather, Processing.  
**Identifiers:** Precautions, \*Tanning industry, Occupational safety and health.

The booklet contains occupational health and safety information for tannery workers. Common hazards are identified and safe work practices suggested. Chemicals used in a tannery are listed along with precautions to take when using them.

**PB-267 371/3** **PC A09/MF A01**  
Environmental Protection Agency, Washington, D.C. Office of Water Supply.  
**Manual of Water Well Construction Practices**  
1977, 178p\* Rept no. EPA/570/9-75/001

**Descriptors:** \*Water wells, \*Construction management, Well tests, Well surveys, Well casings, Well logging, Geophysical prospecting, Construction materials, Payment, Standards.

The report contains standards for water well construction developed by a committee comprised of technical and well contractor personnel. The standards will serve to educate the public and upgrade existing well construction techniques in order to protect ground water reserves.

**PB-267 527/0** **PC A06/MF A01**  
Massachusetts Inst. of Tech., Cambridge. Center for Policy Alternatives.  
**Industrial Prospects for Chitin and Protein from Shellfish Wastes**  
Dale Hattis, and Albert E. Murray. 1977, 107p\*  
MITSG-77-3, CPA-76-7, NOAA-77041808



# APPROPRIATE TECHNOLOGY ABSTRACTS

Grant NOAA-04-5-158-1  
Index No. 77-703-Zle.

Descriptors: \*Chitins, \*Proteins, \*Shellfish, \*Food supply, Industrial wastes, Shrimps, Crabs, Supply(Economics), Food analysis, Byproducts, Marketing, Ion exchange resins, Paper industry, Coagulants, Production, Demand(Economics), Cost analysis, Polysaccharides, Fibers, Tables(Data).  
Identifiers: Sea Grant program, \*Chitosan.

Although chitin and derivatives of chitin have been studied for many years and their intriguing chemical properties have been known, commercial utilization has been almost nonexistent. This study was designed to address the industrial prospects for utilization of chitin. A business strategy involving both chitin and protein from shellfish has been developed and evaluated. The strategy appears to offer a rational and profitable way to resolve the dilemma by treating chitin as a by-product of a protein recovery process that, in some cases, may be profitable even in the complete absence of any markets for the chitin. This strategy should assure availability of dried shell waste in sufficient quantities to make possible production of chitin in amounts needed to supply initial markets. Likely markets are proposed based on an extensive analysis of the literature of chitin applications and markets for similar chemicals.

**PB-267 947/0** **PC A03/MF A01**  
Applied Technology Council, Palo Alto, Calif.  
**Review of Literature on Earthquake Damage to Single-Family Masonry Dwellings**  
Rodger D. Benson. 29 Apr 77, 31p  
Contract HUD-H-2390  
Prepared by Benson and Gerdin, Inc., Phoenix, Ariz.

Descriptors: \*Residential buildings, \*Masonry, Earthquakes, Damage assessment, Earthquake resistant structures, Construction materials, Questionnaires, Surveys.  
Identifiers: \*Earthquake engineering, Western Region(United States).

The report contains a review and evaluation of information concerning the behavior of single-family masonry dwellings in Zone 2 earthquake areas of the United States (1973 Uniform Building Code classification). In general, reinforced masonry has exhibited satisfactory performance, sustaining little or no damage in moderate earthquakes. Reported damage is often associated with poor workmanship/inspection. Unreinforced masonry (old and new) and masonry chimneys have exhibited poor performance. Available data has been found to be limited and general in nature.

**PB-267 949/6** **PC A03/MF A01**  
Economic Research Service, Washington, D.C.  
National Economic Analysis Div.  
**Spain's Leather Industry: Prospects for Blue Chrome (Wet-Blue) Processing**  
Final rept.  
Antonio Del Valle Pintos, and Harold H. Taylor.  
May 77, 41p Rept no. AGERS-30  
Grant NSF-AG-482  
Prepared in cooperation with Instituto Nacional de Investigaciones Agrarias, Zaragoza (Spain). Dept. of Economics and Sociology.

Descriptors: \*Spain, \*Tanning materials, \*Industrial wastes, \*Water pollution control, Manufacturing, Substitution, Employment, Hides, Cattle.  
Identifiers: Wet blue leather, \*Leather industry.

Rapid expansion of the Spanish leather-goods industry has created a serious problem of pollution from tannery effluents. The use of chrome (wet-blue) leather in Spanish tanneries would reduce the pollution caused by cleaning and dehairing of conventional salt-cured hides. It would also reduce the number of workers required in tannery beam-houses, where cleaning occurs. Responding to a 1976 survey, tanners who produced about 80 percent of Spain's finished leather output said they would increase imports of blue chrome leather provided uniform grades and standards could be established to reduce the variability of quality. Tanners estimated that elimination of the beam-house operation might reduce hide finishing costs by 15

percent, and thus most would not be willing to pay more than 15-percent price premium for wet-blue hides. The tanners also indicated that if pollution laws were enforced, they would be more willing to substitute blue chrome for salt-cured hides since this substitution would reduce the beamhouse operation. Any change in demand for blue chrome hides would affect the United States, which supplies about one-fifth of Spain's hide imports.

**PB-267 970/2** **PC A04/MF A01**  
Integrative Design Associates, Inc., Washington, D.C.  
**Appropriate Technology-A Directory of Activities and Projects**  
1977, 75p NSF/RA-770064  
Grant NSF-ERS76-21350

Descriptors: \*Regional planning, \*Directories, Ecology, Ecological succession, Technology, Resources, Utilization, Conservation, Waste management, Recommendations, Environmental surveys, Data acquisition, Problem solving, Constraints, District of Columbia, Research projects, Research.  
Identifiers: Waste recycling.

This is a directory of United States activities in appropriate technology--technology that incorporates a concern for maintenance of the ecological balance by increasing the use of renewable resources, extending recycling and diminishing waste, and fostering the resource independence of local areas. The authors survey the field to learn from individuals and groups about the scope of their activities, the legal and technical problems they are facing in moving from idea to application, and their recommendations for federal activity in support of appropriate technology. This directory is, in part, a compilation of the descriptions of activities of the survey respondents. The descriptions of activities are extracted from a survey sent to individuals and groups as part of this project. Opinions on major obstacles to the further development of appropriate technology are noted.

**PB-268 029/6** **PC A05/MF A01**  
Municipal Environmental Research Lab., Cincinnati, Ohio. Water Supply Research Div.  
**Manual of Treatment Techniques for Meeting the Interim Primary Drinking Water Regulations**  
Thomas J. Sorg, O. Thomas Love, Jr, and Gary S. Logsdon. May 77, 80p\* Rept no. EPA/600/8-77/005

Descriptors: \*Manuals, \*Water treatment, \*Potable water, \*Regulations, Radioactive contaminants, Chemical removal(Water treatment), Inorganic compounds, Water pollution control, Arsenic, Borium, Cadmium, Chromium, Fluorides, Lead(Metal), Mercury(Metal), Organic compounds, Inorganic nitrates, Selenium, Cost analysis, Turbidity, Disinfection, Chlorination, Ozone, Chlorine oxides, Byproducts, Pesticides, Trace elements, Lime, Ion exchanging, Reverse osmosis, Endrin, Chlorine organic compounds, Coliform bacteria, Microorganism control(Water).  
Identifiers: \*Water quality, Methoxchlor, Lindane, D 2-4 herbicide, Silvex, Safe Drinking Water Act of 1974.

Following the passage on December 16, 1974, of Public Law 93-523, The Safe Drinking Water Act, the Interim Primary Drinking Water Regulations were promulgated on December 24, 1975, to take effect June 24, 1977. These regulations set Maximum Contaminant Levels (MCL) for ten inorganic constituents, turbidity, coliform organisms, six pesticides and radionuclides. PL-93-523 stated that the Primary Drinking Water Regulations should consist of MCLs as well as a statement of treatment technology that could be used to achieve these levels. This document provides that information. It contains five sections as related to the five groups of Interim Primary Drinking Water Regulations noted above. This document, based on the literature and the research being conducted by the Water Supply Research Division, is not meant to stifle innovative treatment technology. It attempts to be a statement of technology known at the time of the effective date of the Interim Primary Drinking Water Regulations that will allow utilities, with assistance from their consulting engineers, to apply whatever treatment might be necessary to improve

their drinking water quality such that it meets the Interim Primary Drinking Water Regulations.

**PB-268 081/7** **PC A02/MF A01**  
National Bureau of Standards, Washington, D.C.  
**43 Rules: How Houses Can Better Resist High Wind**  
S. Kliment, N. Raufaste, and R. Marshall. May 77, 14p Rept no. NBSIR-77-1197  
Grant PASA-TA(CE)-94-73

Descriptors: \*Residential buildings, \*Wind(Meteorology), Design criteria, Construction materials, Construction joints, Fasteners.  
Identifiers: \*Wind resistant structures.

This guide presents to designers, builders, government and private building authorities, and building owners and occupants a series of effective methods for improving the resistance of new and existing buildings against high winds. The methods described may be applied to improving the construction of new buildings as well as to increase the wind resistance of existing buildings. This material offers guidelines for selecting the location and orientation of buildings and the building shapes, for suggesting methods of construction, for recommended building details, and for local production of connectors and fasteners. It covers two common types of construction - masonry and timber - as well as selected details, based on local materials such as bamboo and adobe.

**PB-268 124/5** **PC A07/MF A01**  
National Research Council, Washington, D.C.  
Board on Science and Technology for International Development.  
**Leucaena: New Forage and Tree Crop for the Tropics**  
Final rept.  
Jul 77, 126p\* Rept no. CIR/BOSTID-77/24  
Contract AID/csd-2584  
Prepared in cooperation with Philippine Council for Agriculture and Resources Research, College. Text in English, Resume in French and Spanish.

Descriptors: \*Leguminous plants, \*Tropical regions, \*Developing countries, Forage crops, Wood products, Structural timber, Wood pulp, Feeding stuffs, Trees(Plants), Erosion control, Vegetation, Esthetics.  
Identifiers: \*Leucaena leucocephala.

The report describes Leucaena leucocephala, a little-known Mexican plant with bushy and tree-type varieties that produce nutritious forage, firewood, timber, paper pulp, and organic fertilizer. Its diverse uses also include revegetating hillslopes and providing firebreaks, shade, and city beautification.

**PB-268 161/7** **PC A06/MF A01**  
George Washington Univ., Washington, D.C. Graduate Program in Science, Technology, and Public Policy.  
**IRRI Small Agricultural Machinery Project: US Technology Transfer to Resource-Poor Developing Countries**  
Final rept.  
Ann Becker, and Carol A. Ulinski. Dec 75, 103p  
NSF/PRA-19893/3/7  
Contract NSF-STP74-19893  
Continuation of Grant NSF-ST-44205. See also PB-268 001 and PB-268 002.

Descriptors: \*Agricultural machinery, \*Developing countries, \*Technology transfer, Projects, Research, Development, Fabrication, Utilization, Farms, Government policies, Philippines, Performance evaluation, Foreign aid.

This study focuses on the results of the IRRI Small-Scale Agricultural Machinery Project in the Philippines, supported initially by the US Agency for International Development (AID). It examines three main stages of activity: research and development, manufacturing, and adoption of machinery by the farmers. It also studies Philippine Government policies in the light of the Project's objectives and mechanisms to facilitate linkages between each of the stages. The study assesses the success of the Project in terms of the amount of



indigenization of problem-solving capabilities which has been achieved to date.

**PB-268 185/6** **PC A05/MF A01**  
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.  
**Employment, Efficiency and Income in the Rice Processing Industry of Sierra Leone**  
African rural economy paper  
Dunstan S. C. Spencer, Ibi I. May-Parker, and Frank S. Rose. 1976, 92p Rept no. AREP-15  
Prepared in cooperation with Njala Univ. Coll. (Sierra Leone). Dept. of Agricultural Economics and Extension.

Descriptors: \*Rice, \*Food processing, \*Economic development, \*Developing countries, \*Sierra Leone, Policies, Flour mills, Manpower utilization, Capitalized costs, Employment, Income, Prices, Input, Output, Operating costs, Transportation, Mathematical models, Tables(Data), North Africa.

In West Africa the rice processing technologies range from traditional hand pounding to large mechanical mills. Because these technologies have varying factor intensities and output efficiencies the choice of technology in any country will have important effects on factor utilization, particularly employment, and on output. In Sierra Leone the government is currently considering whether investment should be directed to rehabilitation of three existing large mills, purchase of new large mills or encouragement of private investment in small mills including the location of these mills. The specific objectives of this study are: To describe and analyze the traditional and modern techniques of processing rice in Sierra Leone; and to develop a methodology to analyze the employment and income effects of policies.

**PB-268 493/4** **PC A07/MF A01**  
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.  
**The Economics of Rural and Urban Small-Scale Industries in Sierra Leone**  
African rural economy paper  
Carl Liedholm, and Enyinna Chuta. 1976, 142p Rept no. AREP-14  
Prepared in cooperation with Njala Univ. Coll. (Sierra Leone). Dept. of Agricultural Economics and Extension.

Descriptors: \*Economic development, \*Developing countries, \*Industries, \*Sierra Leone, Economic surveys, Rural areas, Urban areas, Policies, Factor analysis, Output, Employment, Data acquisition, Economic analysis.

This report summarizes and describes the major findings and conclusions of our research on small industry in Sierra Leone. The primary objectives of the research were to provide a descriptive profile of small-scale in Sierra Leone, to analyze the key determinants of the demand for and supply of output and employment generated by these industries, and to examine the efficacy of the major policies influencing small-scale industries. The problem setting discussed, followed by an examination of the most important empirical and analytical issues relating to small-scale industries. One section examines the major policy implications of the research.

**PB-268 810/9** **PC A14/MF A01**  
Colorado Univ., Boulder. Dept. of Civil and Environmental Engineering.  
**Segregation and Reclamation of Household Wastewater at an Individual Residence**  
Master's thesis  
Craig Carroll Withee. 1975, 309p OWRT-A-021-COLO(4)  
Contract DI-14-31-0001-5006, Grant EPA-T-900116

Descriptors: \*Sewage disposal, \*Sewage treatment, \*Waste water reuse, Rural areas, Mountains, Residential buildings, Activated carbon treatment, Decomposition, Anaerobic processes, Aerobic processes, Water pollution abatement, Filtration, Biochemical oxygen demand, Separation, Detergents, Toilet facilities, Efficiency, Field tests, Theses, Colorado.  
Identifiers: \*Household wastes.

Disposal of wastewater from isolated homes in mountainous and rural locations in Colorado presents unique and difficult problems. The purpose of the study was to evaluate the flow and pollution patterns from individual homes and to evaluate existing and potential treatment methods. Field evaluation of home wastewater flow and pollutional characteristics was accomplished. The average per capita water use in the home was 44.4 gallons per day and the waste strength was 0.11 pounds per capita per day of BOD. Data for individual fixtures and appliances were obtained with measurement of many pollutional parameters. A brief evaluation of the home treatment methods was accomplished. Laboratory bench scale studies were made to evaluate methods for treatment of the soap related wastes in the home for reuse as toilet flushing water.

**PB-268 820/8** **PC A03/MF A01**  
Colorado State Univ., Fort Collins. Environmental Resources Center.  
**Soil and Rock Strata to Trap, Filter, and Store Water for Rural Domestic Use**  
Technical completion rept.  
Arthur T. Corey, and George L. Smith. Dec 76, 46p OWRT-C-6176(5219)(1)  
Contract DI-14-31-0001-5219

Descriptors: \*Ground water recharge, \*Water supply, \*Arid land, Aquifers, Rainfall, Runoff, Construction, Water storage, Potable water, Earth dams, Soils, Gravel, Dikes, Filtration, Terrain, American Indians, New Mexico, South Dakota.  
Identifiers: \*Artificial recharge.

Experimental rock and soil strata for collection, filtration and storage of rainfall and runoff water were constructed on three separate Indian Reservations: Ramah Navajo, Santa Clara Pueblo in New Mexico, and the Pine Ridge (Oglala Sioux) in South Dakota. The artificial spring strata were constructed to determine their potential in the development and use of Indian and other lands located in the arid and semi-arid sections of the country where the availability of adequate water supplies for domestic use, for watering livestock in otherwise suitable grazing areas, and for the production of food crops is either severely limited as surface water, or the groundwater is non-existent, excessively saline, or at very great depths. The principle objective was to provide a reliable source of potable water at a relatively low cost. The most important factors in the construction of the experimental strata were site location, techniques of construction of the facility, selection of strata material and method of placement of impermeable layer.

**PB-268 986/7** **PC A03/MF A01**  
ACTION/Peace Corps, Washington, D.C. Office of Multilateral and Special Programs.  
**Utilization and Construction of Pit Silos**  
Program and training journal reprint series.  
Mar 77, 47p Rept no. Reprint Ser-15a

Descriptors: \*Silage, \*Forage crops, \*Silos, Farm crops, Harvesting, Preservatives, Corn plants, Grain sorghum plants, Grasses, Fermentation, Storage, Drying, Construction.

Contents: Ensilage hay and pasture crops; Harvesting silage crops; Handy silage preservative guide; Characteristics of high quality hay; Storage of forage; Corn or sorghum silage vs. grass silage; Pit silos; Project ensilage. (Portions of this document are not fully legible.)

**PB-268 987/5** **PC A05/MF A01**  
ACTION/Peace Corps, Washington, D.C. Office of Multilateral and Special Programs.  
**Freshwater Fisheries: Program Planning**  
Program and training Journal manual series  
Steven Gregory. Mar 77, 79p Rept no. Manual Ser-1A

Descriptors: \*Aquaculture, \*Fresh water fishes, \*Developing countries, Instructional materials, Feasibility, Project planning, Fisheries, Personnel development, Job analysis, Ponds, Site surveys, Breeding, Growth, Maintenance, Recommendations, Manuals.  
Identifiers: Zaire Republic.

The report is designed for policy-makers, program planners, trainers, and coordinators who are considering the potential contribution of fresh water fisheries to the people for and with whom they work. It describes in detail intensive fish culture in warm fresh water bodies, particularly artificially constructed fishponds. It is based on Peace Corps experiences, but applicable to a wider audience.

**PB-268 988/3** **PC A06/MF A01**  
ACTION/Peace Corps, Washington, D.C. Office of Multilateral and Special Programs.  
**Conseils de Sante' a la Famille Africaine (Health Advice for the African Family)**  
Program and training journal reprint series.  
Mar 77, 123p Rept no. Reprint Ser-21  
Text in French.

Descriptors: \*Health education, Developing countries, Instructional materials, Manuals, Pregnancy, Nutrition, Birth, Foreign countries, Africa.  
Identifiers: Peace Corps, Infant health care.

The illustrated manual in simple French, provides materials for teaching about pregnancy and childbirth, infant nutrition and basic health precautions, and recipes for infants' meals.

**PB-269 049/3** **PC A05/MF A01**  
ACTION/Peace Corps, Washington, D.C.  
**Contabilidad para la Micro Empresa: Manual de Ensenanza (Accounting for the Small Business: Teaching Manual)**  
Program and training journal reprint series  
Michael W. Ronan. Apr 77, 90p Rept no. Reprint Ser-23  
Text in Spanish.

Descriptors: \*Accounting, \*Manuals, \*Businesses, Spanish language, Instructional materials, Developing countries.  
Identifiers: Small businesses.

A teaching manual for small business accounting is prepared in Spanish text by a Peace Corps Volunteer in Colombia.

**PB-269 519/5** **PC A05/MF A01**  
National Academy of Sciences, Washington, D.C.  
**Drinking Water and Health**  
Summary rept.  
1977, 100p\*  
Contract EPA-68-01-3169

Descriptors: \*Potable water, \*Public health, Assessments, Reviews, Recommendations, Law(Jurisprudence), Legislation, Humans, United States, Contaminants, Microorganisms, Radioactive isotopes, Solutes, Health risks, Toxicity, Epidemiology, Laboratory animals, Experimental data.  
Identifiers: Environmental health, Safe Drinking Water Act of 1974, Public Law 93-523, Particulates, Appendices, \*Water pollution effects(Humans).

The Safe Drinking Water Act of 1974 (PL93-523) required the Administrator of the Environmental Protection Agency to arrange for a study that would serve as a scientific basis for revising the primary drinking water regulations that were promulgated under the Act. The Study was conducted by the Safe Drinking Water Committee of the National Research Council. A thorough study of the scientific literature was undertaken in order to assess the implications for human health of the constituents of drinking water in the United States. Assessment of the health benefits and the economic or technological feasibility of achieving a given level of contaminant control is outside the scope of the study, although the beneficial effects of some constituents of drinking water were considered. The risk to man of contaminants ingested in drinking water was evaluated on the basis of both epidemiological studies and studies of toxicity in laboratory animals.

**PB-269 550/0** **PC A04/MF A01**  
General Accounting Office, Washington, D.C. Community and Economic Development Div.  
**Ground Water: An Overview**  
Report to the Congress.  
21 Jun 77, 56p\* Rept no. CED-77-69



Descriptors: \*Ground water, \*Conservation, \*Water supply, Management, State government, National government, Arid regions, Salt water intrusion, Aquifers, Recommendations.

This report discusses the importance of ground water, problems involving ground water supplies, what is being done to manage ground water, and data needs—primarily in the arid and semi-arid States. Several questions regarding its management, conservation, and use warrant attention by the Congress and study by Federal and State agencies and others responsible for planning and administering water resources development.

**PB-269 689/6** PC A04/MF A01  
Sir J. J. Group of Hospitals, Bombay (India). Tata Dept. of Plastic Surgery.  
**A Comprehensive Rehabilitation Research and Demonstration Programme for Patients in an Urban Population**  
Final rept.  
1975, 71p SRS-19-58139-001  
Grant SRS-19-58139

Descriptors: \*Rehabilitation, \*Leprosy, Attitudes, Urban areas, Surgery, Social psychology, Vocational guidance, India, Developing countries.

A comprehensive research and demonstration project was undertaken in Bombay, India, to study the problems of the rehabilitation of lepers from the social, psychological, medical, and economic points of view. Psycho-social studies were conducted with the aim of reducing the stigma of leprosy. Medical studies developed and evaluated new techniques of dealing with the physical problems of lepers' hands and feet. Lepers were directly prepared for job training, and industrialists came to better understand the problems of the handicapped in conferences with rehabilitation and medical professionals.

**PB-269 892/6** PC A04/MF A01  
General Accounting Office, Washington, D.C. International Div.  
**Restrictions on Using More Fertilizer for Food Crops in Developing Countries: Department of State and Other Federal Agencies**  
Report to the Congress.  
5 Jul 77, 73p Rept no. ID-77-6

Descriptors: \*Farm crops, \*Fertilizers, \*Developing countries, Production, Utilization, Food supply, Government policies, Technical assistance, Prices, Financing, Grants, Recommendations, Tables(Data).

This report is part of a continuing effort to recommend ways U.S. agencies can better help developing countries to improve their food situation. The report discusses the need for governments receiving foreign economic assistance to revise policies which act as constraints to increasing the use of fertilizer for food crops.

**PB-270 038/3** PC A06/MF A01  
American Public Health Association, Washington, D.C. International Health Programs.  
**The State of the Art of Delivering Low Cost Health Services in Developing Countries: A Summary Study of 180 Health Projects**  
Jan 77, 118p  
Contract AID/csd-3423, AID/ta-c-1320

Descriptors: \*Developing countries, \*Health care delivery, Innovations, Populations, Medical services, Reviews, Health care services, Foreign countries, Health care costs, Projects, Health manpower education, Manpower utilization, Health education, Family planning, Nutrition, Health care facilities, Evaluation, Management, Promoting, Tables(Data).  
Identifiers: Maternal and child health services, Appendices.

Contents:  
Project characteristics, activities and obstacles;  
Health manpower training and utilization;  
The delivery of health services;  
The promotion of health—education, organizations and the environment;

Project planning and management;  
Evaluation;  
Innovations in the delivery of low-cost health services.

**PB-270 401/3** PC A05/MF A01  
Transportation Systems Center, Cambridge, Mass.  
**Methanol as an Automotive Fuel with Special Emphasis on Methanol-Gasoline Blends**  
Final rept. Jun-Oct 74  
A. Landman. Apr 77, 89p\* Rept nos. DOT-TSC-OST-74-38, DOT-TSC-OST-77-31

Descriptors: \*Methanol, \*Automotive fuels, Blends, Gasoline, Physical properties, Chemical properties, Forecasting, Comparisons, Automobile engines, Manufacturing, Air pollution, Exhaust emissions, Toxicity, Materials handling, Storage, Utilization.  
Identifiers: Fuel economy.

This report reviews the available information on methanol as related to its potential use as an automotive fuel. Information gaps critical to assessment and future decisions are delineated and suggestions made for necessary R&D efforts. In this context, methanol is characterized and the results of various studies on methanol and methanol-gasoline blends, throughout the United States and elsewhere, are presented and compared. These studies encompass fuels and their use and effects in engines and vehicles. Cost information, although limited, is given as available. The report also describes and summarizes methanol production processes; their promise and expansion possibilities in relation to potential requirements. Various raw material sources are considered in the light of future production potential needs.

**PB-270 607/5** PC A04/MF A01  
Hawaii Univ., Honolulu.  
**Report of the Workshop on Experimental Designs for Predicting Crop Productivity with Environmental and Economic Inputs Held at Honolulu, Hawaii on May 20-24, 1974**  
J. A. Silva, and F. H. Beinroth. May 74, 58p  
Sponsored in part by Agency for International Development, Washington, D.C. Prepared in cooperation with Puerto Rico Univ., Mayaguez.

Descriptors: \*Farm crops, \*Tropical regions, \*Developing countries, Production, Yield, Soil properties, Fertilizers, Irrigation, Experimental design, Research projects, Universities, Research management.

The Universities of Hawaii and Puerto Rico have formulated two projects with the assistance of United States, Agency for International Development (USAID) to undertake some of the necessary research and to design an extension delivery and communications system that will hasten the application of tropical agricultural research. The purposes of the projects are to correlate food crop yields on a network of benchmark soils, and to determine scientifically the transferability of agro-production technology among tropical countries. The workshop, which is the basis of the report, was held to discuss and hopefully to agree upon the experimental designs and research methodology that would be used in the crop production research in these two projects.

**PB-270 775/0** PC A04/MF A01  
Missouri Univ.-Rolla. Dept. of Civil Engineering.  
**Control of Algae in Lakes, Lagoons and Small Reservoirs with Biogrowth Partitions**  
Completion rept. Jul 74-Jun 76  
Bobby G. Wixson, Donald E. Modesitt, Paul Han Cheng, and Walter H. Zachritz. Jun 77, 60p  
OWRT-A-077-MO(2)  
Contract DI-14-31-0001-5025, DI-14-31-0001-6026

Descriptors: \*Algae, \*Pest control, \*Lakes, \*Reservoirs, \*Sewage treatment, Lagoons(Ponds), Growth, Waste water, Oxygen, Dissolved gases, Carbon dioxide, Tanks(Containers), Effectiveness, Design, Biochemical oxygen demand, Field tests.  
Identifiers: \*Biogrowth partitions, Eutrophication.

Research was carried out on the control of algae from small lagoons through laboratory and field studies of manmade biogrowth surfaces for removing or controlling algae. Three lab-scale stabilization lagoons were modified with the addition of biogrowth sheets and operated with 30-day and 15-day detention period. Principal parameters measured were COD, suspended solids, dissolved oxygen, pH, carbon dioxide, and microbial populations. Experimental laboratory results indicated that the application of biogrowth sheets was effective for lagoon stabilization. The practicability and design characteristics of the lagoon modification were then evaluated in field investigations.

**PB-271 002/8** PC A08/MF A01  
Missouri Univ.-Columbia. Agricultural Experiment Station.  
**The Agricultural Development of Nicaragua: An Analysis of the Production Sector**  
Special rept.  
Philip F. Warnken. Jul 75, 172p Rept nos. SR-168, International Ser-1

Descriptors: \*Agricultural economics, \*Developing countries, \*Nicaragua, Farms, Production, Trends, Land use, Manpower, Cost analysis, Farm crops, Income, Livestock, Market value, Fertilizers, Agricultural machinery, Statistical data.

This study presents a benchmark descriptive analysis of agricultural production in Nicaragua. The purpose was to provide an analytical basis whereby priorities for general and specific agricultural policies could be established to further Nicaraguan developmental objectives in the agricultural sector. The study was limited to an analysis of principal agricultural products in Nicaragua and included nine crops and two livestock activities. These activities were grouped into three classes of products: (1) basic grains including corn, beans, rice and grain sorghum; (2) export products including cotton, coffee, sugarcane, tobacco and sesame; and (3) livestock activities which included the beef and dairy enterprises. Together, these activities accounted for over 90 percent of the total value of production from the agricultural sector in 1971. The analysis was further limited to production from the six major regions which lie in the western half of the country. The two eastern regions bordering the Caribbean were excluded from the study since both are economically unimportant in terms of national agricultural output.

**PB-271 376/6** PC A03/MF A01  
ACTION/Peach Corps, Washington, D.C.  
**Strings 'N' Things, A Teaching Manual for the Blind**  
Program and training journal reprint series  
Grace Munns. 26 Aug 77, 39p Rept no. Reprint Ser-24

Descriptors: \*Instructors, \*Specialized training, \*Blindness, \*Manuals, Adults, Rehabilitation, Vocational guidance, Abilities.  
Identifiers: Manual abilities, \*Blind persons, Handicrafts.

This manual is intended to help those with little or no craft experience in working with the blind. The projects illustrated here have been used in a rehabilitation program oriented toward manual dexterity for blind adults. The program begins with simple Macrame projects and progresses to more complicated ones that demand a higher degree of skill and ability.

**PB-271 392/3** PC A03/MF A01  
Georgia Inst. of Tech., Atlanta. Economic Development Lab.  
**Pyrolytic Conversion of Agricultural and Forestry Wastes in Ghana - A Feasibility Study**  
Jul 76, 47p  
Contract AID/ta-C-1290  
Prepared in cooperation with Council for Scientific and Industrial Research, Kumasi (Ghana). Building and Road Research Inst., and Technology Consultancy Center, Kumasi (Ghana).

Descriptors: \*Agricultural wastes, \*Wood wastes, \*Pyrolysis, \*Fuels, \*Ghana, Reclamation, Solid waste disposal, Charcoal, Manufactured gas, Fuel



oil, Design, Combustion chambers, Cost estimates.

Identifiers: Appropriate technology.

This report describes the results of a field study to determine the quantities and characteristics of waste in Ghana and the feasibility of using pyrolytic conversion of these wastes. The study shows that Ghana is generating 2,735,100 tons of agricultural and forestry waste materials each year that are suitable for pyrolytic conversion. Using pyrolytic conversion of all these waste materials, approximately 342,000 tons of charcoal and perhaps 273,000 tons of oil could be produced. The market value of the end products would be about \$48,396,000 each year. A preliminary description of an appropriate technology version of a continuous/batch pyrolytic conversion system is also presented in this report.

**PB-271 709/8** **PC A02/MF A01**  
Florida Dept. of Natural Resources, Tallahassee.  
**Mass Culture of Freshwater Prawns for Commercial Evaluation**  
Completion rept. 1 Jul 75-31 Dec 76  
Scott A. Willis. Jul 77, 13p NOAA-77072535

Descriptors: \*Shellfish, \*Aquaculture, \*Animal nutrition, Feeding stuffs, Weight(Mass), Cost analysis, Fresh water fishes, Survival, Florida.  
Identifiers: \*Macrobrachium rosenbergii.

Post larval *Macrobrachium rosenbergii* were fed various amounts of Purina trout chow to determine optimal feeding requirements during nursery development. During the four week study, best results were found in treatments fed amounts of food which decreased weekly as the food demand of the prawns decreased. The two treatment replicates fed 10, 7 1/2, 5, and 2 1/2% body weight daily during each week had increases from 0.03 g to 0.35 g and 0.26 g mean prawn weight, 100 and 98.7% survival, and food conversion ratios of 1.2 and 1.8:1. This refinement in determination of prawn food needs would allow 10,000 post larvae to be reared for four weeks in a nursery situation for a food cost of \$1.80.

**PB-271 710/6** **PC A04/MF A01**  
Florida Dept. of Natural Resources, St. Petersburg, Marine Research Lab.  
**Growout of the Giant Malaysian Prawn, *Macrobrachium rosenbergii*, in Earthen Ponds in Central Florida**  
Completion rept. May-Nov 76  
Scott A. Willis, and Mark E. Gerrigan. 1977, 54p NOAA-77072536

Descriptors: \*Shellfish, \*Aquaculture, Growth, Weight(Mass), Feeding stuffs, Survival, Fresh water fishes, Harvesting, Management, Ponds, Florida.  
Identifiers: \*Macrobrachium rosenbergii, Predators.

Postlarval and juvenile *Macrobrachium rosenbergii* were stocked in twelve 0.025 ha earthen ponds to study the effects of stocking size and density on growth and survival. Following each four week sampling interval, feeding rates were adjusted based on mean body weight and an estimated 5% mortality. Management practices employed to enhance production levels included complete analysis of water quality parameters, use of fertilizer to sustain planktonic blooms, mechanical and chemical water weed control, and identification of predators. All prawns were sexed at harvest and length-weight relationships were determined for both male and female prawns.

**PB-271 714/8** **PC A04/MF A01**  
Tennessee State Univ., Nashville.  
**A Complete Disposal-Recycle Scheme for Agricultural Solid Wastes**  
Final rept. Jan 74-Jun 76  
Michael R. Busby, Greg Tragitt, Roland Norman, and Kenneth Hillsman. May 77, 62p EPA/600/2-77/089  
Contract EPA-R-802739

Descriptors: \*Solid waste disposal, \*Agricultural wastes, \*Anaerobic processes, \*Reclamation, Methane, Fuels, Fertilizers, Feeding stuffs, Sludge disposal, Animal nutrition, Chemical analysis, Sampling, Process charting, Performance evaluation.  
Identifiers: Manure, Waste recycling.

This investigation applied the anaerobic process to the production of methane gas and a stabilized sludge from cow manure and farm clippings in laboratory pilot plants as well as a full-scale (2,000 gal.) digester system. The quantity and quality of gas produced, the biochemical and chemical oxygen demands, and the nutritional value of the digested sludge for both the laboratory and full-scale plants were evaluated.

**PB-271 739/5** **PC A04/MF A01**  
General Accounting Office, Washington, D.C. Community and Economic Development Div.  
**More and Better Uses Could Be Made of Billions of Gallons of Water by Improving Irrigation Delivery Systems: Department of Agriculture and the Interior**  
Report to the Congress.  
2 Sep 77, 53p Rept no. CED-77-117

Descriptors: \*Water supply, \*Distribution systems, \*Irrigation, Federal assistance programs, Water loss, Seepage, Requirements, Agriculture, Electric power plants, Recreation, Irrigation canals, Ground water, Improvement, Litigation, Research projects, Recommendations, Financing.  
Identifiers: \*Water conveyance.

Billions of gallons of water seep from inefficient irrigation delivery systems in the western states. By reducing such seepage, more water could be available for crop irrigation, energy development, environment improvement, and recreation. This report discusses opportunities to administer better the Federal programs providing the funds for water conveyance system improvements and the benefits to be derived.

**PB-271 847/6** Not available NTIS  
National Bureau of Standards, Washington, D.C.  
**Adobe Building Materials: Properties, Problems, and Preservation**  
Final rept.  
J. R. Clifton. 1977, 4p  
Pub. in Tech. Conservation, p30-34 Spring 77.

Descriptors: \*Construction materials, \*Residential buildings, Soils, Bricks, Fabrication, Molding techniques, Sunlight, Research, Preserving.  
Identifiers: \*Adobe brick, Reprints.

Earth, air, and water--three of the four elements of the ancient world--have been combined for several millennia to form a versatile building material. This product, sun-dried earth bricks, or adobe, was easy to make and use in pre-industrialized societies. No great technical skill or equipment was necessary. Fabrication required only mixing soil and water, shaping the mixture into forms, and exposing them to the atmosphere to set them. Once hardened, the bricks were ready to use. The National Bureau of Standards is studying the properties of adobe to determine what problems may be associated with it, and how best to preserve adobe in old buildings.

**PB-272 005/0** **PC A05/MF A01**  
General Accounting Office, Washington, D.C. Community and Economic Development Div.  
**Food Waste: An Opportunity to Improve Resource Use: Department of Agriculture**  
Report to the Congress.  
16 Sep 77, 84p\* Rept no. CED-77-118

Descriptors: \*Food, \*Wastes, \*Resources, Food consumption, Food supply, Production capacity, Food industry, Management, Consumer affairs.  
Identifiers: \*Food wasting, Department of Agriculture.

The report discusses the Department of Agriculture's past and current activities concerning food loss in the United States, as well as a broader assessment of loss. Study results indicate that about one-fifth of all food produced for human consumption is lost annually in the United States. In the

world context of rising population, uncertain weather, and concern with the availability of resources, every opportunity should be taken to improve food system management in this country. More attention should be directed at the causes of food waste, new management technology for reducing loss, and improvement of consumer understanding.

**PB-272 129/8** **PC A06/MF A01**  
Boise Center for Urban Research, Idaho.  
**Analysis of Alternatives to Refuse Disposal**  
Final rept.  
Jim Baker, Mike Bowlin, Carol Hansberger, and Phil Hanson. May 77, 104p UO-LCCM-BOI-77-009, HUD/RES-1140  
Prepared in cooperation with League of Cities-Conference of Mayors, Inc., Washington, D.C., Contract HUD-H-2196R.

Descriptors: \*Solid waste disposal, \*Management planning, Garbage, Sanitary landfills, Reclamation, Materials recovery, Land use, Refuse disposal, Marketing, Separation, Site surveys, Paper, Metals, Iron, Aluminum, Wood wastes, Plastics, Leather, Incinerators, Biodeterioration, Fuels, Water pollution control, Government policies, Regulations, Geology, Demography, Cost analysis, Financing, Idaho.  
Identifiers: Ada County(Idaho), Waste recycling, Pyrolysis incineration, Refuse derived fuels, Source separation.

The researchers reviewed six alternative solid waste methods. The six alternatives considered were: continued landfill; household or source separation; pyrolysis; biodegradation; waste-based solid fuel production; incineration. The use of a sanitary landfill is virtually unavoidable now and in the near future. Whatever plan or alternative is adopted for Ada County, a certain percentage of waste or amount of residue will ultimately end up in a landfill. It is at the present, the most practical, least-cost method of disposing of garbage. However, the sanitary landfill is not without problems. For instance, the Hidden Hollow Sanitary Landfill, Ada County's primary landfill site, opened in 1971 and was expected to last up to 1986. However, due to an increasing volume of garbage, the life expectancy has been shortened and the closing date is now estimated to be about 1980. As citizens become familiar with more sanitary and productive methods of disposing and/or utilizing solid waste, traditional landfill techniques will become less acceptable. Also, as the cost of energy escalates, landfill will not be cost effective compared to processes that recover materials or energy from solid waste. (Portions of this document are not fully legible)

**PB-272 436/7** **PC A03/MF A01**  
Economic Research Service, Washington, D.C. Natural Resource Economics Div.  
**Impact of Hail Suppression on Nebraska Crop Production: A Simulation Study**  
Final rept. for 1971  
Larry M. Boone. Sep 77, 46p Rept no. AGERS-39  
Grant NSF-AG-275

Descriptors: \*Hail, \*Weather modification, \*Farm crops, \*Nebraska, Production, Cost analysis, Marketing, Prices, Demand(Economics), Tables(Data), Linear programming, Computerized simulation.

A linear programming analysis was used to simulate effects of hail suppression on Nebraska crop production. Production costs and crop patterns in ten major land resource areas (LRAs) were estimated for 10%, 25%, and 50% levels of hail suppression effectiveness, and compared to costs and production distribution patterns without hail suppression. With hail suppression effectiveness of 50%, total production costs in the state would have increased less than 1/2%. Corn production would have been 2% higher; wheat production, 3.7% higher. With hail suppression, production shifts of the same crop between LRAs were less than 2%. Hail suppression would not have caused substantial shifts of land use from one crop to another within an LRA. If hail suppression technology were widely used it could influence production of some crops enough to change price.



## APPROPRIATE TECHNOLOGY ABSTRACTS

**PB-272 651/1** PC A06/MF A01  
Virginia Polytechnic Inst. and State Univ., Blacksburg. Coll. of Agriculture and Life Sciences.  
**Evaluation of Investment Opportunities: Tools for Decisionmaking in Farming and Other Businesses**  
Final rept.  
Arthur J. Walrath. Jun 77, 108p\* Rept no. AH-349  
Sponsored in part by Economic Research Service, Washington, D.C. Economic Development Div.

Descriptors: \*Farm management, \*Investments, \*Decision making, Return on investment, Costs, Fixed investment, Discounted cash flow, Savings, Profits, Computation, Tables(Data).

This report offers business managers, including farmers, easy-to-use guides for analyzing investment opportunities. Examples show how to classify and compare various costs and returns. Formulas are given which can be applied to business decisions. They emphasize the time-value concept of money by using compounding and discounting methods. Tables are presented for determining the future value of a present sum, present value of a present sum, and present and future values of annuities. Although aimed at the businessman, the handbook can also be used to make household decisions: one example shows how much has to be saved each month to reach a savings goal in five years.

**PB-272 681/8** PC A20/MF A01  
Industrial Environmental Research Lab.-Cincinnati, Corvallis, Oreg. Food and Wood Products Branch.  
**Proceedings of National Symposium on Food Processing Wastes (8th) held on March 30 - April 1, 1977 in Seattle, Washington**  
Aug 77, 463p\* Rept no. EPA/600/2-77/184

Descriptors: \*Food processing, \*Meetings, \*Water pollution control, Filtration, Brines, Revisions, By-products, Materials recovery, Industrial waste treatment, Guidelines, Canners, Sludges, Anaerobic process, Standards, Water pollution control, Odor control, Lagoons(Ponds), Assessments, Residues, Seafood, Tomatoes, Fruits, Vegetables, Feedstuffs, Proteins, Dairy, Poultry, Preservatives. Identifiers: Water reuse, Meat packing industry, Biological industrial waste treatment.

The Proceedings contains copies of 29 of the 31 papers presented at the Eighth National Symposium on Food Processing Wastes. Subjects included: processing modifications, product and by-product recovery, wastewater treatment, water recycle and water reuse for several segments of the food processing industry. These segments included: red meat and poultry, seafood, dairy, fruit, and vegetable. Attendance at the two and one-half day Symposium was approximately 200 with good representation by industry, universities, consulting firms, as well as state and Federal agencies.

**PB-272 702/2** PC A03/MF A01  
Robert S. Kerr Environmental Research Lab., Ada, Okla.  
**Environmental Effects of Septic Tank Systems**  
Rept. for 1976-77  
Marion R. Scalf, William J. Dunlap, and James F. Kreissl. Aug 77, 43p\* Rept no. EPA/600/3-77/096

Descriptors: \*Septic tanks, \*Sewage disposal, \*Water pollution abatement, Environmental impacts, Adsorption, Rural areas, Mountains, Ground water, Surface waters, Design, Regulations, Water pollution control, Sludge disposal, Leaching, Trends, Water wells, Oklahoma.  
Identifiers: Remote areas.

Septic tank-soil absorption systems are the most widely-used method of on-site domestic waste disposal. Almost one-third of the United States population depends on such systems. Although the percentage of newly constructed homes utilizing septic tanks is decreasing, the total number continues to increase. Properly designed, constructed, and operated septic tank systems have demonstrated an efficient and economical alternative to public sewer systems, particularly in rural and sparsely developed suburban areas. However, be-

cause of their widespread use in unsuitable situations, they have also demonstrated the potential for contamination of ground and surface waters.

**PB-272 908/5** PC A11/MF A01  
National Water Well Association, Worthington, Ohio.  
**Proceedings of the National Ground Water Quality Symposium (3rd) Held in Las Vegas, Nevada on September 15-17, 1976**  
Final rept. 31 Mar 76-31 Jan 77.  
Jun 77, 240p\* EPA/600/9-77/014  
Contract EPA-68-03-2396

Descriptors: \*Ground water, \*Water pollution, \*Meetings, Land use, Potable water, Waste disposal, Subsurface drainage, Ground water recharge, Las Vegas Valley, Sewage disposal, Industrial wastes, Soil water, Ponds, Linings, Permeability, Seepage, Water table, Design criteria, Arid land, Nitrogen, Earth fills.  
Identifiers: Ground water movement, Artificial recharge, Sewage irrigation, Valdose zone.

The Third National Ground Water Quality Symposium was held in Las Vegas, September 15-17, 1976, in conjunction with the annual convention of the National Water Well Association. There were eight main sessions encompassing twenty-four technical papers. These were concerned with the disposal of waste on the land, the movement of pollutants in the subsurface, and artificial recharge. A special session was dedicated to ground water in the Las Vegas Valley.

**PB-273 099/2** PC A04/MF A01  
Integrative Design Associates, Inc., Washington, D.C.  
**Appropriate Technology in the United States--An Exploratory Study**  
Eugene Eccli. 1977, 59p NSF/RA-770066  
Grant NSF-ERS76-21350  
See also PB-267 970. Prepared in cooperation with Design Alternatives, Inc., Washington, D.C.

Descriptors: \*Research projects, \*Technology innovation, Regional planning, Ecology, Resources, Utilization, Conservation, Waste management, Environmental surveys, Problem solving, Constraints, Universities, Industries, Scientists, Professional personnel, Barriers, Technology transfer, Quality of life.  
Identifiers: Appropriate technology.

The study surveys those in the United States currently active in the field of appropriate technology, describes their efforts, explores factors inhibiting the development and application of their innovations, reports on their recommendations for Federal and National Science Foundation activities in support of appropriate technology, and assesses the policy implications of appropriate technology in relation to an environmentally and resource constrained economy. Two hundred and ninety-four individuals and groups from target populations concerned with issues related to the environment, local participation in planning and technology development, and unemployment/income stabilization responded to the survey. This report explains the methodology used to elicit and interpret information; presents the background information about the respondents; reports on major issues of several innovator constituencies; analyzes the survey experience and examines the social and economic trends in both the U.S. and the developing countries which are related to appropriate technology.

**PB-273 182/6** PC A03/MF A01  
Office of Technology Assessment, Washington, D.C.  
**Organizing and Financing Basic Research to Increase Food Production**  
Jun 77, 44p\* Rept no. OTA-F-49  
Library of Congress Catalog Card no. LCCCN-77-600025.

Descriptors: \*Food supply, \*Production, Research management, Photosynthesis, Nitrogen fixation, Plant genetics, Government policies, Grants.

The report analyzes alternatives in the organization and financing of basic research to increase

food production. Alternative organizations of basic research are described and evaluated. The report discusses alternative levels of funding for basic research in the areas of photosynthesis, nitrogen fixation, and genetic engineering for plants. Alternative administrative structures for Federal support of basic research related to food production are suggested.

**PB-273 264/2** PC A06/MF A01  
Corvallis Environmental Research Lab., Oreg.  
**Biological Control of Aquatic Nuisances - A Review**  
Final rept.  
Gerald S. Schuytema. Jul 77, 101p\* Rept no. EPA/600/3-77/084

Descriptors: \*Aquatic weeds, \*Weed control, Reviews, Cyanophyta, Viruses, Fungi, Bacteria, Fishes, Snails, Phytoplankton, Zooplankton, Competition, Damage, Ecology, Algae.  
Identifiers: Biomanipulation, Biological insect control, Eutrophication, Water hyacinths, Alligator weeds, Agasicles, Neochetina, Predation, Tilapia.

A total of 532 references on the biological control of aquatic nuisances were reviewed. Three major control approaches exist. Grazing and predation have been the most frequently utilized techniques, with emphasis on macrophyte control by fish and insects. The use of pathogens is potentially effective, with most promise in macrophyte control. Biomanipulation, the exploitation of the interrelationships among plants and their environment is a most promising technique for eutrophic systems. This approach includes increasing algal grazers while controlling zooplanktivores and exploiting the competitive and growth limiting reactions among various species. The importance of using host-specific organisms to prevent damage to desirable components of the ecosystem is emphasized.

**PB-273 286/5** PC A18/MF A01  
H. H. Aerospace Design Co., Inc., Bedford, Mass.  
**Automobile Scrapage and Recycling Industry Study - Overview Report**  
Final rept. Jun-Dec 75  
R. Kaiser, R. P. Wasson, and A. C. W. Daniels.  
Sep 77, 409p\* DOT-TSC-OST-77-11  
Contract DOT-TSC-1028

Descriptors: \*Automobiles, \*Solid waste disposal, \*Materials recovery, \*Economic analysis, Motor vehicles, Metal scrap, Plastics, Iron alloys, Government policies, Regulations, Waste processing, Legislation, Trends, Steels, Rubber industry, Tires.  
Identifiers: \*Waste recycling, \*Junk car disposal, Metal recycling, Scrap recycling, Plastics recycling, Secondary materials industry, Tire recycling.

The principal factors which influence the recovery of materials from junked automobiles are reviewed and evaluated. These include the number and materials composition of the automobiles that are retired annually in the U.S.; the flow of junk automobiles into the commercial recovery cycle and problems associated with abandoned automobiles; operations of the auto wrecking industry where serviceable parts are salvaged; and the structure, operations and technology of the scrap industry which transforms automobile hulks into commercial grades of metal scrap. Since Federal laws and policies impact on the reclamation of materials from junked automobiles, a legal review of key legislation and policies is also included. Because of a strong demand for auto hulks by scrap processors, created by an increased market for ferrous scrap, the problem of an ever increasing accumulation of unprocessed deregistered automobiles has been stabilized. In 1974, the fractional recovery of metallic materials from the approximately ten million automobiles deregistered that year was higher than from other forms of obsolete scrap. The estimated value of the recovered materials was in excess of one billion dollars.

**PB-273 529/8** PC A08/MF A01  
Arizona Univ., Tucson. Office of Arid Lands Studies.  
**The Application of Technology in Developing Countries**  
Rept. for Aug-Dec 76



Robert L. Bulfin, Jr. and J. Richard Greenwell.  
1977, 172p  
Contract AID/ta-6-1111  
Papers presented during an Interdisciplinary Programs Seminar Series, August-December 1976.

Descriptors: \*Technology transfer, \*Developing countries, \*Meetings, Technology assessment, Food industry, Water resources, Agriculture, Engineering.  
Identifiers: Appropriate technology.

The chapters in this volume are based on papers delivered during a weekly seminar series at the University of Arizona between September and December, 1976. These seminar series were originally held under the auspices of the University's Natural Resources Program, an interdepartmental activity made possible by a 211(d) institutional grant to the University from the U.S. Agency for International Development; the seminars are now sponsored by the University's Office of Interdisciplinary Programs. The volume, like the original seminar series, represents the varying, and sometimes differing, views of specialists in such fields as industrial, civil, nuclear, agricultural, and systems engineering, physical geography, and cultural anthropology; these views also represent both the University of Arizona and other nationally-known institutions.

**PB-273 553/8** **PC A05/MF A01**  
General Accounting Office, Washington, D.C. International Div.  
**Coffee: Production and Marketing Systems**  
Report to the Congress.  
28 Oct 77, 98p\* Rept no. ID-77-54

Descriptors: \*Coffee, \*Production, \*Marketing, Agreements, Foreign countries, Prices, Stabilization, Developing countries, Exports, Supply(Economics), Demand(Economics).  
Identifiers: Department of State, Market shares.

Coffee is produced in 53 countries and territories and is vital to the economies of many underdeveloped countries that produce it. In 1976 its export value was more than \$8 billion, second in value only to petroleum in international commodity trade. The United States has joined the 1962, 1968, and 1976 International Coffee Agreements primarily to help stabilize prices and export income of the developing producing countries. Fluctuations in the price of exported coffee appear to be in response to anticipated future availability. However, the policies and procedures of exporting countries can influence availability and create pressure on prices.

**PB-273 572/8** **PC A07/MF A01**  
General Accounting Office, Washington, D.C. International Div.  
**The Challenge of Meeting Shelter Needs in Less Developed Countries**  
Report to the Congress.  
4 Nov 77, 135p Rept no. ID-77-39

Descriptors: \*Developing countries, \*Housing, Residential buildings, Housing deficiencies, Financial support, Loans, Disadvantaged groups, Low income groups, Banking business, Economic analysis, Shortages, International relations, United States, Latin America, Africa, Foreign countries.  
Identifiers: Agency for International Development, United Nations, World Bank.

This report describes the worldwide housing shortage and the shelter assistance efforts of the Agency for International Development, the multilateral lending institutions, private and voluntary organizations, and certain bilateral donors. This review was made to provide an overview of the world housing situation and to identify some of the problem areas in the planning and management of housing development assistance. The report makes recommendations to assist international donors, principally the Agency for International Development, in improving their efforts to provide shelter assistance to the less developed countries.

**PB-273 752/6** **PC A03/MF A01**  
Minnesota Agricultural Experiment Station, St. Paul.

**World Market Conditions for Grains; Prospects and Problems, with Special Reference to the Developing Countries**

Martin E. Abel. 1977, 29p Rept no. MISC-143

Descriptors: \*Market surveys, \*Grains(Food), \*Developing countries, Production, Foreign countries, Marketing, Policies, International trade, Prices, Agriculture, Reserves, Consumption.

Dramatic changes in world grain prices since 1972 have caused serious questions to be raised about the level and stability of future grain prices. All countries are concerned with these questions, but they especially involve a large number of developing countries. Some developing countries are important grain exporters, and future world market conditions bear directly on their prospects for foreign exchange earnings and the ability to finance development. Many other developing countries are net grain importers and the behavior of grain prices in the future will affect the ability of these countries to import grain, insure domestic food price stability, and protect the nutritional well-being of large segments of their population. World market conditions for grains during the next 5 to 10 years could be highly uncertain, compared with conditions that prevailed in the 1950s and 1960s. This paper focuses on policy options which may be open to countries, individually or collectively, for dealing with uncertain market conditions. First, the evolution of the current world market situation for grains, the patterns of international trade in grains, and the basic problems that the current situation generates for different types of countries are discussed. Next, the future prospects for grain production, consumption, trade, and policy options for dealing with the future are examined. Finally, alternative mechanisms for implementing a variety of policy options are reviewed. The focus is on grains because they represent the basic category of food, worldwide, and are the most important form in which food is transferred among countries.

**PB-273 766/6** **PC A04/MF A01**  
SCS Engineers, Long Beach, Calif.  
**Refuse Collection Vehicle Performance Specification: User's Guidebook**  
Final rept.  
20 Sep 77, 71p NSF/RA-770265  
Contract NSF-C77-04424

Descriptors: \*Motor vehicles, \*Trucks, \*Solid waste disposal, \*Specifications, \*Manuals, Refuse disposal, Garbage, Collection, Hauling, Compacting, Performance evaluation, Management planning, Procurement, Government policies, Local government, Geography, Containers, Regulations, Process charting, Cost analysis, Service life.

This guidebook introduces the use of performance specifications in the procurement of refuse collection vehicles, presenting a methodology for developing such specifications for payload capacity, compaction cycle time, and reload time. In addition, the User's Manual, the final product of the research effort, is previewed. In this document are discussions of: (1) the concept, overview, and data sources of the performance specification process; (2) the description and purpose of the User's Manual; (3) the performance specification of vehicle payload capacity; (4) the specification of compaction cycle and reload times; and (5) life cycle costing.

**PB-274 429/0** **PC A12/MF A01**  
National Research Council, Washington, D.C.  
**Perspectives de la Recherche Agronomique en Afrique (Prospects for Agronomic Research in Africa)**  
1976, 259p  
Contract AID/csd-2584  
Text in French.

Descriptors: \*Agronomy, \*Developing countries, \*Africa, Research projects, Education, Soils, International relations, Economic development, Agricultural economics, Manpower, Organizations, Books, Requirements, Grain crops, Grasses.  
Identifiers: Priorities, Institutional framework.

This study focuses on the question of how agricultural science and specifically agricultural research can contribute most effectively to the progress of

the African nations and peoples. It covers the following topics: (1) Agricultural and educational priorities; (2) role of non-African agencies in coordination of agricultural research and education; (3) appropriate channels of communication and cooperation among nations and institutions within and outside of Africa; (4) means by which research and education can be applied most effectively to African agricultural development; and (5) a broad assessment of the scientific manpower needs of the research systems and institutions recommended by the NAS Committee.

**PB-274 436/5** **PC A06/MF A01**  
Washington Univ., Seattle. Coll. of Fisheries.  
**Aquaculture in Southeast Asia. A Historical Overview**  
Shao-Wen Ling. 1977, 122p\* CONTRIB-465,  
ISBN-0-295-95560-0, NOAA-77101207  
Library of Congress Catalog Card No. 77-3828.

Descriptors: \*Ponds, \*Aquaculture, \*Southeast Asia, Shellfish, Fisheries, Indonesia, Philippines, Malaysia, South Vietnam, North Vietnam, Cambodia, Harvesting, Developing countries, Economic development, Reproduction(Biology), Thailand, Burma, China, Coasts, Taiwan, Singapore.  
Identifiers: Sea Grant Program.

Aquaculture had its cradle in Asia. It developed there some four thousand years ago in harmony with a traditional rural-agrarian economy, and it is now heading towards some fascinating developments. Aquaculture in the Southeast Asian region, including Indonesia, the Philippines, Malaysia, Singapore, Vietnam, Cambodia, Thailand, Burma, and the southern China coast to Taiwan is examined. The species cultured in the area are identified and the collection and production of stocking material is explained. Culturing facilities are described and information is given on aquaculture practices and techniques.

**PB-274 612/1** **PC A08/MF A01**  
National Research Council, Washington, D.C. Board on Science and Technology for International Development.  
**Expansion des Ressources en Eau dans les Zones Arides, Techniques Prometteuses et Possibilités de Recherches (Expansion of Water Resources in Arid Regions. Promising Techniques and Opportunities for Research)**  
1977, 165p  
Contract AID/csd-2584  
Text in French.

Descriptors: \*Water supply, \*Arid land, \*Developing countries, \*Agriculture, Water conservation, Research projects, Water consumption, Social effect, Harvesting, Project planning, Runoff, Deserts, Reservoirs, Evaporation, Rainfall, Irrigation, Salinity, Water wells, Waste water.  
Identifiers: \*Water harvesting, Research needs.

Little known but promising technologies for the use and conservation of scarce water supplies in arid areas are the subject of this report. Not a technical handbook, it aims to draw the attention of agricultural and community officials and researchers to opportunities for development projects with probable high social value. Each technology is presented in a separate chapter and arranged under the following topics: methods, advantages, limitations, stage of development, needed research and development, selected readings (a short list of reviews and general articles) and contacts (a list of individuals or organizations the panelists know to be involved in relevant research).

**PB-274 644/4** **PC A15/MF A01**  
Cornell Univ., Ithaca, N.Y.  
**Pest Control Strategies**  
Final rept.  
Edward H. Smith, and David Pimentel. 1977, 331p\*  
Contract EQ7AC012

Descriptors: \*Pest control, \*Meetings, \*Pesticides, Socioeconomic status, Plants(Botany), Fruit crops, Trees(Plants), Urban areas, Potatoes, Corn, Soybean plants, Trends, Insect control, Law(Jurisprudence), Weed control, Forecasting,



# APPROPRIATE TECHNOLOGY ABSTRACTS

Organic compounds, Substitutes, Environmental surveys.  
Identifiers: Alfalfa, Environmental chemical substitutes, Biological insect control, Computer applications.

Papers presented at a symposium held at Cornell University in June 1977, including the role of the USDA in integrated pest management, history and complexity of IPM, socioeconomic and legal aspects, obstacles and incentives, and case studies on alfalfa, deciduous tree fruits, potatoes, corn, and soybeans. (Portions of this document are not fully legible)

**PB-274 715/2** **PC A13/MF A01**  
Department of Transportation, Washington, D.C.  
**Proceedings of the National Symposium on Transportation for Agriculture and Rural America, Held at New Orleans, Louisiana, on November 15-17, 1976**

John O. Gerald, Kenneth L. Casavant, Robert J. Tosterud, and William F. Brown. 1 Aug 77, 286p\*  
Rept no. DOT-TST-77-33

Prepared in cooperation with Farm Foundation, Chicago, Ill., North Dakota State Univ., Fargo, Upper Great Plains Transportation Inst., and Cooperative State Research, Washington, D.C.

Descriptors: \*Transportation, \*Agricultural products, \*Meetings, \*Rural areas, International trade, Regulations, Economic impact, Services, Cargo transportation, Passenger transportation, Policies, Energy conservation, Research, Planning, United States.  
Identifiers: \*Rural transportation.

There is growing concern about the appropriateness of national and state transportation planning, policies, and funding arrangements for maintaining an efficient and equitable transportation system in rural America. Symposium sessions were held on the following topics: Transportation of agricultural commodities for international trade; impacts of transportation regulation on agriculture; people, commodity and service transport in rural America; economics of freight transportation in low density rural areas; and impacts on rural transportation from changes in the energy situation and transportation policies.

**PB-274 759/0** **PC A05/MF A01**  
National Inst. for Occupational Safety and Health, Cincinnati, Ohio.  
**Health and Safety Guide for Plywood and Veneer Mills**  
Jun 77, 82p Rept no. DHEW/PUB/NIOSH-77/186

Descriptors: \*Industrial hygiene, \*Woodworking, \*Dust control, \*Noise(Sound), Guidelines, Regulations, Hazardous materials, Protective clothing, Fire protection, First aid, Sanitation, Materials handling, Atmosphere contamination control, Safety engineering, Environmental engineering, Accident prevention, Storage, Records management.  
Identifiers: \*Occupational safety and health, Air pollution control, Checklists, Protective equipment.

The report is intended to assist in providing for a safe and healthful work place in the plywood and veneer mills by describing safe practices and pointing out some of the more commonly violated safety and health standards. The main topics covered include: health and safety guidelines; frequently violated regulations; occupational health and environmental control; hazardous materials; personal protective equipment; fire protection; medical and first aid; sanitation; plant equipment; materials handling and storage; hand and portable power tools; welding, cutting and brazing; electrical code. (Color reproductions in black and white)

**PB-275 180/8** **PC A06/MF A01**  
Woods Hole Oceanographic Institution, Mass.  
**Bivalve Mollusc Culture in a Waste Recycling Aquaculture System**  
Technical rept.  
John H. Ryther, and Roger Mann. Sep 77, 119p  
WHOI-77-59, NOAA-77110301  
Grant NOAA-04-6-158-44106

Descriptors: \*Mollusca, \*Aquaculture, \*Circulation, \*Shellfish, Mixtures, Waste water, Oysters, Clams, Shellfish, Substrates, Food chains, Algae, Sea water, Sewage treatment, Phytoplankton, Feeding stuffs, Ponds, Nutrients, Monitoring.  
Identifiers: Sea Grant program, \*Crassostrea gigas, \*Ostrea edulis, \*Mytilus edulis, Argopectin irradians, Tapes japonica, Secondary sewage treatment.

During the Sea Grant fiscal year 1976-77, research continued on the development of a waste recycling aquaculture system at Woods Hole Oceanographic Institution. In the present system mixtures of secondary treated sewage effluent and seawater are used to mass culture marine phytoplankton on a continuous basis in large outdoor ponds. These phytoplankton are then fed to filter feeding bivalve molluscs (oysters, clams, mussels). The effluent from the mollusc culture tanks is passed through cultures of macroscopic red algae to effect final removal of excess and excreted nutrients from the earlier stages of the controlled food chain. Work has centered on the effects of physical parameters on optimizing shellfish growth. Also monitoring of phytoplankton species predominance in mass algal cultures continued in an attempt to gain further understanding of this important phenomenon. Separate studies are reported on and included in this report.

**PB-275 182/4** **PC A04/MF A01**  
San Diego State Univ., Calif. Center for Marine Studies.  
**Alternative Management Plans for Yellowfin Tuna in the Eastern Tropical Pacific**  
Special rept.  
V. G. Flagg. 1977, 55 NOAA-77110314  
Grant NOAA-04-3-158-22

Descriptors: \*Tunas, \*Economic development, \*Fisheries, Management, Tropical regions, Regression analysis, Fishing, Licenses, Abundance, Recommendations, Leasing, Prices, Economic impact, Weight(Mass), Exploitation, Harvesting, Taxes, Cost analysis, South Pacific Ocean.  
Identifiers: Sea Grant program, \*Overfishing, Quotas.

A simplified version of the economics of ocean fisheries is presented in general terms as it applies to the eastern tropical Pacific yellowfin tuna fishery. Recommendations for eliminating excess capacity and overfishing in the eastern Pacific are discussed and evaluated. Regression results on cost and revenue estimation in the fishery are given. These results were used to evaluate the impact of various management techniques on the industry.

**PB-275 230/1** **PC A05/MF A01**  
California Univ., Davis. Dept. of Agricultural Engineering.  
**Technological and Economic Assessment of the Utilization of Rice Straw Residue from the California Sacramento Valley for On-Farm Power Generation**  
Final rept.  
Brian Horsfield, and R. O. Williams. Aug 76, 95p  
ERDA/USDA-19464/76/FR-1  
Contract USDA-12-14-1001-603  
See also report dated 20 Oct 76, PB-275 082.

Descriptors: \*Electric power generation, \*Biological energy conversion, Agricultural wastes, Plant residues(Organic), Rice plants, Farm crops, Straw, Grain crops, Agricultural engineering, Gasification, Harvesting, Storage, Technology, Feasibility, Benefit cost analysis, Return on investment, California.

The report examines alternative energy uses for California Sacramento Valley rice straw residue. This area of California can produce approximately 2 million tons of straw which has enough energy to provide 30% of the fuel requirements for a 1,000 megawatt plant. The report deals with methods of harvest, collection and storage, and provides an economic assessment of several methods, including total harvest. On-farm utilization of the energy content of rice straw is discussed with regard to rice drying and irrigation pumping. Off-farm use is also considered. (Color illustrations reproduced in black and white)

**PB-275 241/8** **PC A09/MF A01**  
Dornbusch (David M.) and Co., Inc., San Francisco, Calif.  
**The Importance of Water Supply to Indian Economic Development**  
Completion rept.  
James P. Merchant, and David M. Dornbusch.  
1977, 184p OWRT-C-7042(6205)(1)  
Contract DI-14-34-0001-6205

Descriptors: \*Water supply, \*Economic development, Economic analysis, Linear programming, Coal, Agriculture, Public land, Financing, Manpower, Economic impact, Water rights, North Dakota, South Dakota.  
Identifiers: \*Indian reservations, Fort Berthold Reservation, Rosebud Sioux Reservation, Todd County(South Dakota).

The importance of water supply to economic development was analyzed for the Fort Berthold (North Dakota) and Rosebud Sioux (South Dakota) Reservations. A linear programming model was developed for each Reservation's economy to determine the importance of water as a factor of production. Marginal productivity curves for water were constructed by varying the water supply assumed to be available to each Reservation. Both Reservations face substantial legal barriers to the full use of available water supplies. Should the Fort Berthold and Rosebud Sioux Reservations lose key legal contests, the resulting water shortage could limit the value added of their economies to 74 percent and 50 percent of their respective full potentials. Other factors which impede full development of Reservation resources include lack of financing, jurisdictional uncertainties, land ownership patterns, and a shortage of managerial and labor skills. The study offers guidelines for asserting water rights and for ameliorating some of the conditions inhibiting development.

**PB-275 245/9** **PC A04/MF A01**  
Woods Hole Oceanographic Institution, Mass.  
**Towards a Marine Policy in Latin America**  
Francisco J. Palacio. Oct 77, 63 WHOI-77-63,  
NOAA-77110302  
Grant NOAA-04-6-158-44106

Descriptors: \*International relations, \*Government policies, \*Ocean environments, \*Latin America, Resource management, Water resources, Conservation, Fisheries, Economic factors, Social effect, Appraisals, Mineral deposits, Developing countries, Mexico, Central America.  
Identifiers: Sea Grant program, Law of the Sea, Global.

The need in Latin America for the adoption of comprehensive policies which consider the ocean as an integral and important part of the process of development is stressed. The ability to adopt and implement such policies is directly related to the marine scientific capability of the country and to national awareness of ocean affairs. The utilization and preservation of the oceans should be the result of national and regional ocean policies in Latin America. Thus, national ocean studies should be undertaken to identify areas of economic and social concern upon which such policies should be based. Developmental strategies in Latin America should include appraisals of marine ecosystems and the impact of development upon them; at a regional level the strategies should also consider the global role of the ocean in the biosphere.

**PB-275 290/5** **PC A04/MF A01**  
General Accounting Office, Washington, D.C.  
Community and Economic Development Div.  
**National Water Quality Goals Cannot Be Attained Without More Attention to Pollution from Diffused or 'Nonpoint' Sources**  
Report to the Congress.  
20 Dec 77, 55p\* Rept no. CED-78-6

Descriptors: \*National government, \*Industries, \*Municipalities, \*Water pollution abatement, Sources, Grants, Sediments, Mine waters, Pesticides, Runoff, Agriculture, Forestry, Financing, Water pollution control, Expenses, Erosion control, State government, Local government, Project planning, Recommendations.



Identifiers: \*Nonpoint sources, Mine acid drainage, Silviculture.

Water quality goals cannot be achieved in many rivers and lakes because of diffused, or 'nonpoint,' sources of water pollution. Limited controls exist and agencies developing comprehensive control plans under grants from the Environmental Protection Agency lack sufficient resources to gather needed data--a result of past and current emphasis on controlling industrial and municipal point sources of water pollution.

**PB-275 344/0** **PC A05/MF A01**  
North Carolina State Univ., Raleigh. Sea Grant Coll. Program.

**Wood in Marine Structures. Proceedings of a Seminar Held at Wrightsville Beach, North Carolina on October 7-8, 1977**

Michael Levi, and Jerry Machemehl. Jul 77, 100p\* UNC-SG-77-12, NOAA-77110702  
Grant NOAA-04-6-158-44054

Descriptors: \*Wooden structures, \*Structural timbers, \*Meetings, Marine borer prevention, Wood preservatives, Creosote, Construction materials, Marine borers, Fungi, Fasteners, Civil engineering, Bulkheads, Harbor structures, Ship piers, Sea walls, Impregnating, Maintenance, Loads(Forces), Wood, Docks, Structural design.  
Identifiers: Sea Grant program.

This is a compilation of 9 papers that were presented at the seminar on the use of wood in marine structures. The subjects dealt with are: Wood as a construction material; Marine borers and fungi; Preservative systems and specifications; Fasteners in marine structures; Waves, currents, wave forces and coastal processes; Planning, design, and construction of timber walls and bulkheads; Planning, design, and construction of piers and walkways; Use of pressure treated wood in building small boat facilities; and Wharf inspection and maintenance.

**PB-275 345/7** **PC A03/MF A01**  
Hawaii Agricultural Experiment Station, Honolulu.  
**An Alternative Prawn Production Systems Design in Hawaii**

Technical rept.  
Richard T. Gibson, and Jaw-Kai Wang. May 77, 38p UNIH-SEAGRANT-TR-77-05, HAES-Journal Ser-2142, NOAA-77110420

Grant NOAA-04-6-158-44026, NOAA-04-6-158-44144

Report on Tropical Animal Aquaculture--Prawn Production and Management Systems Development.

Descriptors: \*Fresh water, \*Aquaculture, \*Crustacea, \*Hawaii, Economic development, Industries, Ponds, Reproduction(Biology), Design, Improvement, Savings, Cost analysis, Systems engineering.

Identifiers: \*Macrobrachium rosenbergii, Sea Grant program.

Freshwater prawn farming is a new and dynamic growth industry in Hawaii. Considerable progress has been made in hatching and rearing techniques since they were first introduced in 1965, yet there is still considerable room for improvement, especially for the grow-out system. The current 'Anuenue' strategy is broken down to functional components and examined in detail through use of engineering economy methods. Areas with short-term potential for improvement are identified and an alternative approach utilizing a narrow canal pond design is recommended. There are various advantages of this alternative which result in a cost savings of 14.8%. The basic short-term improvement recommended is a pond design that permits mechanization of costly operations such as feeding, harvesting, and pond maintenance and the development of sophisticated management strategies aimed at increasing yields.

**PB-275 386-T** **PC A99/MF A01**  
Agricultural Research Service, Washington, D.C.

**Pollination of Agricultural Crops by Bees (Opylenie Pchelami Sel'skokhozyaistvennykh Kul'tur)**

A. N. Mel'Nichenko. 1977, 712p Rept no. TT-74-52054  
Trans. of Vsesoyuznaya Akademiya Sel'skokhozyaistvennykh Nauk. Doklady (USSR) v3 1960, by B. R. Sharma. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Foundation.

Descriptors: \*Pollen, \*Bees, \*Farm crops, Yield, Agriculture, Plants(Botany), Fruit crops, Conveyors, Production, Mortality, Vegetable crops, Economic factors, Color, Aromatic compounds, Translations, Books, Wheat plants, USSR.

Identifiers: Pollination, Angiosperms, Heterosis.

The relationships between the biology of flowering, the fertilization of plants, and the biology of bees have intrigued investigators for many years. The results of new studies and experiments, have confirmed that the cross-pollination of entomophilous plants by bees is of paramount importance not only for increasing yield and improving seed and fruit quality, but also for the production and exploitation of heterosis in a number of bee-pollinated crops. The proceedings published in the present volume illustrate this point with new material. The book provides interesting material for agronomists, apiculturists, plant breeders and professional beekeepers.

**PB-275 434/9** **PC A03/MF A01**  
International Ferrocement Information Center, Bangkok (Thailand).

**The Potentials of Ferrocement and Related Materials for Rural Indonesia; a Feasibility Study**  
Ricardo P. Pama, and Opas Phomratanapongse. Oct 77, 28p

Sponsored in part by Agency for International Development, Djakarta (Indonesia). Prepared in cooperation with Siam Cement Co. Ltd., Bangkok (Thailand).

Descriptors: \*Construction materials, \*Indonesia, Developing countries, Pontoons, Water tanks, Storage tanks, Grains(Food), Well casings, Toilet facilities, Boats.

Identifiers: \*Ferrocement, Appropriate technology.

This report summarizes the results of a short feasibility study conducted in Indonesia by a ferrocement team from the Asian Institute of Technology. Ferrocement has been identified as an appropriate technology material with many potential applications in developing countries especially in the rural areas. Field visits were made during the period October 4-18, 1977 in West Java, South Sulawesi and North Sumatra to obtain first hand information about the conditions of the rural people. The primary result of the survey is the identification of seven (7) potential applications of ferrocement and related materials; these are: pontoons, dug-out canoes, water jars, toilet bowls, well casings, grain storage bins and building boards. The report recommends that extensive testing, field demonstration and evaluation be conducted to determine especially their social acceptability by the villagers before full-scale implementation is undertaken.

**PB-275 569/2** **PC A04/MF A01**  
Georgia Inst. of Tech., Atlanta. Economic Development Lab.

**Pyrolytic Conversion of Agricultural and Forestry Wastes to Alternate Energy Sources in Indonesia; a Feasibility Study**

John W. Tatam, Filino Harahap, Tze I. Chiang, R. Muchidin Apandi, and Harsono Wirjosumarto. Feb 77, 54p

Contract AID/ASIA-C-1203

Prepared in cooperation with Institute of Technology Bandung (Indonesia). Development Technology Center, and Padjadjaran Univ., Bandung (Indonesia).

Descriptors: \*Agricultural wastes, \*Wood wastes, \*Pyrolysis, \*Indonesia, Reclamation, Solid waste disposal, Fuels, Charcoal, Oils, Manufactured gas, Economic analysis, Design, Feasibility.

The study was conducted in Indonesia in a joint effort by personnel from the Engineering Experiment Station at the Georgia Institute of Technol-

ogy and the Development Technology Center at the Institute of Technology Bandung. The principal circumstance that led to the study is the severe firewood cutting of the forests, especially in Java, which has resulted in damage to soil, water, and mangrove resources, with the resulting need for an alternate source of fuel for cooking. The study involved (1) an investigation of the production of agricultural and forestry wastes in Indonesia; (2) an evaluation of the market for the char, oil, and gas which are products of the pyrolytic conversion process; (3) the development of a preliminary pyrolytic conversion system design; and (4) an approximate economic evaluation of the system. The primary results of the waste survey indicate that at least 17 million tons of wastes are produced in Indonesia each year, with rice hulls comprising a third of the total and sawmill, coconut, logging, rubber, oil palm wastes and bagasse comprising the remainder. From the available wastes it is estimated that about 1.5 million tons of charcoal and .9 million tons of pyrolytic oils could be produced.

**PB-275 658/3** **PC A04/MF A01**  
Energy Task Force, Inc., New York.

**Windmill Power for City People**

Final rept.

Mary Christianson. May 77, 73p\* OEO-LN-2137  
Grant CSA-20156

Descriptors: \*Windmills, \*Windpower utilization, \*Wind power generation, \*Urban areas, Wind turbines, Windpowered generators, Power transmission towers, Design, Drawings, Systems engineering, New York.

Identifiers: New York City(New York).

This report discusses the first urban windmill used as an alternative energy source. The windmill was designed and installed at 519 East 11th Street, a tenement building in New York City. Findings show that the energy produced from the windmill is an important renewable energy resource which can be used in most urban areas and which reduces dependency on utility companies. A brief history of the windmill's origin, design and installation procedures are outlined. Also included are comparisons of energy savings of the windmill energy versus the utility companies. An appendix consists of literature, resources, a wind speed and direction map of the USA, structural engineering calculations and an explanation of windforces on windmills.

**PB-275 811/8** **PC A07/MF A01**  
National Demonstration Water Project, Washington, D.C.

**Rural Community Action: Status and Recommendations**

Final rept.

Stanley Zimmerman. Oct 77, 137p\* OEO-LN-2147

Grant OEO-30141G-77-01

Descriptors: \*Community development, \*Rural areas, Projects, Services, Low income groups, Policies, Management, Housing studies, Medical services, Unemployment, Socioeconomic status.  
Identifiers: \*Community Action Programs, Poverty groups, \*Antipoverty programs.

The report is an evaluation of the Community Action Program in rural America. The report describes the conditions and problems of the poor in rural areas: limited resources and mobility, lack of necessary job skills, poor housing stock and inadequate health care. In addition, the poor lack visibility and local officials are unwilling to rely on formal antipoverty programs. Successful rural community action programs are described and recommendations for future directions are given.

**PB-275 958/7** **PC A02/MF A01**  
Texas A and M Univ., College Station. Dept. of Wildlife and Fisheries Sciences.

**Crawfish and Freshwater Shrimp Diseases**

Report on Sea Grant Program

S. K. Johnson. 1977, 20p\* TAMU-SG-77-605, NOAA-77112805

Descriptors: \*Shrimps, \*Parasites, \*Crustacea, Fresh water, Diseases, Bacteria, Fungi, Protozoa, Worms, Microorganisms, Aquatic animals.



Identifiers: Sea Grant program, \*Crayfishes, Commensalism, Procamburus.

The handbook is designed as an information source and field guide for crustacean culturists, commercial fishermen and others interested in parasites or abnormal conditions of freshwater crustaceans. In addition to detailed descriptions and illustrations of the common parasites and commensals, the publication includes information on the life cycles and general biological characteristics of disease producing organisms which spend all or part of their life cycles with crawfish and freshwater shrimp. Several conditions of unknown cause are also described. This guide concentrates on living agents and on illustrations and photographs of the structure and effects of such agents. (Color illustrations reproduced in black and white)

**PB-276 055/1** **PC A03/MF A01**  
Integrative Design Associates, Inc., Washington, D.C.

## **Appropriate Technology and Agriculture in the United States**

A. Becker, and E. Eccli. 1977, 29p NSF/RA-770065

Grant NSF-ERS76-21350

Descriptors: \*Policies, \*Agriculture, Ecology, Recommendations, Environmental impacts, Citizen participation, Pest control, Income, Planning, Employment, Food processing, Constraints, Surveys, Marketing, Transportation, Food supply, Project planning, Urban areas, Research needs, Assessments, United States.

Identifiers: \*Appropriate technology, Energy demand, Agribusiness, Organic farming.

The purpose of this report is to survey those in the United States currently active in the field of appropriate technology, describe their efforts, explore factors inhibiting the development and application of their innovations, report on their recommendations for Federal and National Science Foundation activities in support of appropriate technology, and assess the policy implications of appropriate technology. Two hundred and ninety-four individuals and groups from target populations concerned with issues related to the environment, local participation in planning and technology development, and unemployment/income stabilization responded to this survey. This paper is a compilation of the major ideas of approximately 40 individuals and groups who responded to the survey primarily because of their interests in the agricultural dimension of appropriate technology.

**PB-276 129/4** **PC A04/MF A01**  
General Accounting Office, Washington, D.C. International Div.

## **U.S. Participation in International Agricultural Research**

Report to the Congress.

27 Jan 78, 64p\* Rept no. ID-77-55

Descriptors: \*Agriculture, \*Research projects, \*Developing countries, International relations, Research management, Project planning, Universities, Organizations, Recommendations, Financing, Vegetables, Fertilizers, Pest control, Vertebrates, Birds, Rodents, Bats, Nutrition, Food, Technical assistance.

Identifiers: Priorities.

The importance of research to aid developing countries in meeting their food needs is being emphasized increasingly. Much attention has focused on the international agricultural research centers as a result of the development of high-yield varieties of rice and wheat which created the hope of a 'Green Revolution.' This report examines the Agency's support of international agricultural research centers and its research strategy and makes recommendations for improving management of the program.

**PB-276 174/0** **PC A04/MF A01**  
Williamson Engineering Associates, Inc., Navarre, Fla.

## **The Application of Wind Energy Systems to Desalination**

Edgar A. Cadwallader, John E. Westberg, and William R. Williamson. 22 Apr 77, 68p OWRT/S-78/1

Contract DI-14-34-0001-7523

Descriptors: \*Desalting, \*Wind power generation, \*Water treatment, Economics, Electric power generation, Brackish water, Electrodialysis, Reverse osmosis, Technology, Potable water, Water pollution.

Identifiers: \*Desalination, Wind turbines.

The impact of rapidly increasing fuel costs has all but made saline water conversion uneconomical. However, the application of wind energy systems to membrane processes for brackish water conversion offers an economical solution. Commercially available wind turbines and those under development appear promising for producing electrical energy at costs ranging from five cents down to 1.8 cents per kilowatt hour. It is still possible to reach costs for desalting brackish water at less than \$1.00 per thousand gallons with large wind energy/desalination systems. The coupling of wind energy turbines to electrodialysis and reverse osmosis also offers technological advantages, such as variable energy outputs from wind turbines, to optimize variable fluid flows in the desalination processes for maximum, economic production of potable water. Research and development efforts in this direction are indicated.

**PB-276 469/4** **PC A07/MF A01**  
National Research Council, Washington, D.C. Board on Science and Technology for International Development.

## **Methane Generation from Human, Animal, and Agricultural Wastes**

1977, 136p\*

Contract AID/csd-2584

Library of Congress Catalog Card no. 77-92794.

Descriptors: \*Methane, \*Solid waste disposal, Plants(Botany), Agricultural wastes, Sewage, Design criteria, Public health, Benefit cost analysis, Anaerobic processes, Fermentation, Economic analysis, Feasibility, Technology, Microbiology, Substrates, Storage, Performance evaluation, Safety.

Identifiers: \*Refuse derived fuels, Energy sources, Manure, Manufactured gas, Synthetic fuels.

### **Contents:**

- Overview--(Introduction and history, System description, and Economic feasibility of methane production);
- Technology of anaerobic fermentation--state of the art--(Biological mechanisms, Raw materials and their preparation, Product storage and use, Residue composition, storage, and use, and Public health aspects);
- Technology of anaerobic fermentation;
- Engineering process design--(General design considerations, Design criteria, Operation and maintenance, Performance measurement, and safety);
- Research and development needs--(General issues, and technical R&D issues).

**PB-276 507/1** **PC A05/MF A01**  
Instituto de Capacitacion, Guatemala City. Dept. Tecnico Didactico.

## **Manual Talla de Madera (Wood Carving Manual)**

1945, 97p Rept no. MD-41

Text in Spanish.

Descriptors: \*Woodworking, Manuals, Wood products, Spanish language, Instructional materials, Tools.

The report contains instructions in Spanish in carving and finishing objects of wood.

**PB-276 746/5** **PC A03/MF A01**  
Economic Development Administration, Washington, D.C. Program Analysis Div.

## **Source Bibliography Employee Stock Ownership Plans (ESOP)**

Oct 77, 37p\* Rept no. EDA-78-032

Descriptors: \*Employees, \*Investments, \*Capital, \*Bibliographies, Corporations, Industries, Incentives, Motivation, Savings, Benefits, Legislation.

Identifiers: \*Employee stock ownership,

\*ESOP(Employee Stock Ownership Plans), Employee stock ownership plans.

The bibliography was compiled with the assistance of three useful research tools: the SCORPIO data bank maintained by the Library of Congress; the New York Times data bank; and an ESOP bibliography prepared by the Congressional Research Service. Employee Ownership Plans have been viewed as a means of improving employee motivation and productivity, diversifying the ownership of capital, providing alternatives to conventional compensation and benefit plans, and saving jobs. An Employee Stock Ownership is an employee benefit program through which employees can acquire part or all of the stock in the corporation for which they work. Since the ESOP Act of 1973, four additional pieces of legislation have been adopted relating to the use of the employee stock ownership concept.

**PB-276 908/1** **PC A08/MF A01**  
Arizona Univ., Tucson. Office of Arid Lands Studies.

## **The Impact of Groundwater Development in Arid Lands: A Literature Review and Annotated Bibliography**

Information paper

Susan Jo Keith. 1977, 153p\* ARID LANDS

RESOURCE-IP-10, OWRT-W-197(5254)(2)

Contract DI-14-31-0001-5254

Descriptors: \*Ground water, \*Water pollution, \*Arid land, \*Water supply, \*Bibliographies, Environmental impacts, Social effect, Economic impact, Economic development, Subsidence, Developing countries, Stream flow, Agriculture, Irrigation, Reviews, Aquifers, American Indians, Arizona, Pakistan.

Identifiers: \*Water management(Applied).

As groundwater comes increasingly under development, it is imperative, for economic, ecological, and political reasons, to anticipate the impact of its development. The literature is reviewed on this impact in arid lands in terms of two general categories: physical environment impacts and socioeconomic impacts. Two case studies are presented: One focuses on the impact of groundwater development on the Papago Indians; the second, through a discussion of groundwater development in Pakistan, demonstrates the role groundwater development can play in the economic development process in developing arid countries.

**PB-276 946/1** **PC A04/MF A01**  
Michigan Univ., Ann Arbor. Inst. for Social Research.

## **Employee Ownership. Employee Stock Ownership Plan (ESOP), Survey Research Center, Institute for Social Research, University of Michigan**

1978, 70p\* EDA-78-029

Grant EDA-99-6-09433

Descriptors: \*Economic development, \*Technical assistance, Capital, Assets, Purchasing, Employees, Benefits, Profits, Investments, Economic evaluation, Industries, Corporations, Statistical analysis.

Identifiers: \*ESOP(Employee Stock Ownership Plan), \*Employee stock ownership plan, \*Employee stock ownership.

The study is about one of the most recent variations to emerge in the Employee Stock Ownership Plan, or ESOP, which permits employees to acquire up to 100 percent of the equity of the firm for which they work. This plan not only affords a real increase in property ownership for the workers as individuals, but also serves as an instrument for new corporate capital formation. Data have been collected on 98 firms, including such information as industry type, number of employees, magnitude of sales volume, the percent of employees who participate in the ownership plan. In thirty of the companies we were able to obtain actual data about profit and we therefore analyzed for this sub set of companies the relationship between profit and some of the aspects of ownership.



**PB-276 959/4** PC A09/MF A01  
Denver Research Inst., Colo.  
**Report on the Workshop, New U.S. Initiatives in International Science and Technology, Held at Keystone Colorado, April 13-16, 1977**  
Aug 77, 195p\*  
Grant NSF-INT76-1499

Descriptors: \*Technology transfer, \*Meetings, Developing countries, Foreign aid, International relations, Leadership, Scientists, Cooperation, Recommendations.  
Identifiers: Appropriate technology.

The Denver Research Institute conducted on April 13-16, 1977, a workshop on new U.S. initiatives...under the sponsorship of NSF. Fifty members of the U.S. science and technology community met to examine present U.S. international S&T goals, policies and mechanisms, and to recommend future directions. The workshop addressed these issues within the context of working groups divided into developed, developing and underdeveloped nations and international organizations. A number of recommendations for change in U.S. policy, planning, program activities are presented in this report.

**PB-276 972/7** PC A08/MF A01  
Forest Service, Portland, Oreg. Div. of Engineering.  
**Guidelines for Use of Fabrics in Construction and Maintenance of Low-Volume Roads**  
Interim rept.  
John E. Steward, Ron Williamson, and John Mohnney. Jun 77, 174p\*

Descriptors: \*Fabrics, \*Pavements, Roads, Non-woven fabrics, Woven fabrics, Pavement bases, Fluid filters, Drainage, Separators, Reinforcing materials, Soil stabilization, Waterproofing, Barrier coatings, Soil erosion, Erosion control, Earthwork, Permeability, Cost analysis, Soil mechanics.  
Identifiers: \*Road materials.

Porous woven and non-woven fabrics have been used in road construction in Region 6 since 1974. The fabrics have been used: (1) as filters for sub-surface drainage; (2) separation layers to prevent subgrade soil contamination of base layers; (3) subgrade restraining layers for weak subgrades; (4) earth reinforcement to build retaining walls; (5) erosion control, and (6) water proofing membranes. A reference notebook titled 'Fabrics in Construction' is due for release to Region 6 Forests in June 1977. This notebook contains a description of current practices and the state-of-the-art in the use of fabrics in road construction and maintenance. The notebook defines terminology and lists the key factors involved in each usage, and relates the fabric physical and chemical properties to the intended usage. The notebook also contains appropriate technical literature, manufacturers' literature and cost data on the known available fabrics. This report highlights the contents of the reference book and discusses the current knowledge for the use of fabrics in low-volume road construction and maintenance.

**PB-277 515/3** PC A02  
California Univ., Bodega Bay. Bodega Marine Lab.  
**Development of Crustacean Aquaculture**  
R. A. Shleser. 1975, 18p NOAA-78011702  
Grant NOAA-04-5-158-20  
Pub. in European Symposium on Marine Biology (10th), Ostend, Belgium 17-23 Sep 75, v1 p455-471 1975.

Descriptors: \*Aquaculture, \*Food chains, \*Algae, Crustacea, Lobsters, Crabs, Feeding stuffs, Diets, Water quality, Tanks(Containers), Design, Growth, Systems engineering, Cost engineering.  
Identifiers: Reprints, Homarus americanus, Cancer magister, Macrobrachium rosenbergii.

The Aquaculture Program of Bodega Marine Laboratory is an interdisciplinary effort directed toward the development of aquaculture technology. The primary area of emphasis is the culture of the American lobster Homarus americanus. Research in the areas of water quality, nutrition, genetics, physiology, pathology, microbiology, algology, engineering and economics, have been integrated to emphasize the understanding of the economics of

culture. The presentation describes how work in each of these areas has general application to the culture of other species. The culture of Dungeness crabs, freshwater prawns and other crustaceans are currently being investigated. Recent regulations requiring strict control of levels of metabolites in mariculture effluents have led to investigations of the potential of various species of algae to take up ammonia, nitrate, and nitrite. These algae may then serve as food for shellfish such as oysters, clams, scallops, and mussels. The economics of these food chains are discussed.

**PB-277 726/6** PC A03/MF A01  
Transport and Road Research Lab., Crowthorne (England).  
**Forecasting Rural Road Travel in Developing Countries from Studies of Land Use**  
J. D. G. F. Howe, and B. S. Tennant. 1977, 38p  
Rept no. TRRL-SUPPLEMENTARY-754

Descriptors: \*Developing countries, \*Rural areas, \*Travel, Forecasting, Roads, Surveys, Land use, Interviews, Kenya, Vehicular traffic, Planning, Great Britain.  
Identifiers: Vehicle ownership.

In many developing countries, the difficulty of standardizing trip measurements, the flexibility with which vehicles are used and the absence of a conventional sampling frame for interviewing road users are the main obstacles to forecasting travel from land use. A study in Kenya has shown the difficulties of using roadside interviews for establishing trip relationships, but has indicated that a suitable sampling frame could be constructed by a direct survey of vehicle owners. The vehicle owner in the broadest sense would then become the fundamental unit for trip studies. The Report suggests that home and workplace questionnaire surveys, focussing on the vehicle owner, may be suitable for the extensive sampling necessary to evolve standards for studies of rural trip characteristics. Definitions of employment suitable for land-use/transport studies in developing countries are suggested in the Report. These covered only 4 percent of the population of the study area, but nevertheless, statistically they provided the best explanation both for vehicle ownership and for trip generation. Trip origins from Agricultural and Residential land uses did not reach significant proportions. The main generators were Retail and Commercial, Road Transport, and Government Administration land uses, which together accounted for over 75 percent of urban trip origins and 57 percent of all trip origins. (Copyright (c) Crown Copyright 1977.)

**PB-277 769/6** PC A15/MF A01  
Pusat Penyelidikan Masalah Kelistrikan, Jakarta (Indonesia).  
**Technical Forum on Direct Current Transmission Held in Jakarta on 18-19 October 1976**  
1977, 328p Rept no. LMK-03-EP-77  
Sponsored in part by Technology Transfer Inst., Tokyo (Japan) and Electric Power Development Co. International Ltd., Tokyo (Japan).

Descriptors: \*Electric power transmission, \*Meetings, HVDC systems, DC systems, Power transmission lines, High voltage, Electric converters, Overhead power transmission, Oil-filled cables, Submarine cables, Thyristors, Switchgear, Control equipment, Circuit protection, Transformers, Indonesia.

Contents:  
Outline of high voltage DC transmission;  
Equipment and components of direct current transmission systems;  
Prospects for Indonesia;  
Transmission line;  
D.C. cable and accessories. (Portions of this document are not fully legible)

**PB-278 033/6** PC A07/MF A01  
National Inst. for Occupational Safety and Health, Cincinnati, Ohio.  
**Health and Safety Guide for Sawmills and Planing Mills**  
Jul 77, 132p\* Rept no. NIOSH-78-102

Descriptors: \*Safety engineering, \*Sawmills, \*Milling machines, \*Guidelines, Machine tools, Planing,

Woodworking, Workplace layout, Requirements, Standards, Industrial hygiene, Safety devices, Ventilation, Hazardous materials, Personnel development, Accident prevention, Human factors engineering, Protective equipment, Fire safety.  
Identifiers: Occupational safety and health.

The guide assists in providing a safe and healthful workplace for sawmills and planing mills. It describes safe practices and helps correct some of the more frequently encountered violations of the safety and health standards. The main topics covered include: the hazards most commonly encountered in saw mills; health and safety guidelines and programs; tools and equipment; walking and working surfaces; standard guard rails; exits and exit markings; occupational health and environmental control; ventilation; noise exposure; hazardous materials, spray painting; personal protective equipment; respiratory protection; sanitation; medical and first-aid; fire protection; compressed air equipment; powered industrial trucks; hoisting equipment; machinery and machine guarding; electrical code.

**PB-278 264/7** PC A03/MF A01  
Woods Hole Oceanographic Institution, Mass.  
**Marine Shrimp Farming in the Western Hemisphere. Appendix C. A Marine Shrimp Culture Bibliography**  
Joe A. Hanson, John E. Huguenin, Suzanne E. Huguenin, and Harold L. Goodwin. Dec 77, 46p  
WHOI-77-69, NOAA-78012601  
Grant NOAA-04-5-158-13  
Sponsored in part by Oceanic Inst., Waimanalo, Hawaii.

Descriptors: \*Shrimps, \*Aquaculture, \*Bibliographies, Crustacea, Substrates, Feeding stuffs, Larvae, Reproduction(Biology), Life cycles, Growth, Ponds, Cooling water, Parasites, Diets, Taxonomy, Marketing, Indexes(Documentation).  
Identifiers: Sea Grant program, Predation.

This bibliography has been compiled through a series of iterations, each one more comprehensive and better organized than its predecessors. Shrimp culture is presently a very dynamic field and such a bibliography, dependent on published information, will not completely reflect current capabilities existing in laboratories or in the field. The bibliography provides an organized method for the serious investigator to acquire in-depth scientific and technical information. A subject index of selected references and an author index have been provided.

**PB-278 351/2** PC A05/MF A01  
Florida Univ., Gainesville. Inst. of Food and Agricultural Sciences.  
**Sugarcane Production Residues: Technologic and Economic Assessment of Methods for Conversion to Utilizable Energy Forms**  
Final rept.  
R. A. Nordstedt, P. H. Smith, L. O. Bagnall, and F. LeGrand. Mar 78, 82p DOE/USDA-19464/76/FR-2  
Contract USDA-12-14-1001-604

Descriptors: \*Energy conversion, \*Bagasse, Solid waste disposal, Residues, Feasibility, Technology, Economics, Anaerobic processes, Pyrolysis, Incineration, Process charting, Design criteria, Performance evaluation, Sugarcane, Solid wastes.  
Identifiers: \*Refuse derived fuels.

This report examines the technologic and economic feasibility of converting sugarcane production residues in South Florida to utilizable energy forms. Quantity and location of the residues are given. Current uses of the residues are outlined and compared with other potential uses which are described in the literature. Technological problems in collection of the field residues are discussed. The resulting research and development needs are outlined. An in-depth economic comparison of anaerobic digestion, shaft pyrolysis, and waterwall incineration is presented. Economic feasibility of each of the three processes is presented as a function of plant size using current market prices for energy and the energy price increases which would be necessary to make each of the processes economically feasible.



**PB-278 882/6** PC A03/MF A01  
Economics, Statistics, and Cooperatives Service,  
Washington, D.C. National Economic Analysis Div.  
**Farmer-to-Consumer Marketing**  
Final rept.  
H. R. Linstrom. Feb 78, 31p Rept no. ESCS-01

Descriptors: \*Agricultural products, \*Marketing,  
Vegetables, Fruits, Profits, Consumer affairs, Bene-  
fits, Quality, Legislation.  
Identifiers: \*Direct marketing, Farmer to consumer  
Direct Marketing Act 1976, Farmers markets.

Estimates indicate there were over 13,000 farmer-  
to-consumer direct-marketing outlets in the United  
States in 1976. Farmers view this as an alternative  
market outlet to increase their income. Consumers  
see it as a means of getting fresher, higher quality  
foods at less cost. Consumers also see social and  
cultural benefits from direct contacts with farmers,  
visits to farms, and a so-called return to nature.  
Passage of the Farmer-to-Consumer Direct Mar-  
keting Act of 1976 reflects national interest in  
direct marketing of farm products, and there is  
strong evidence of increased attention at the state  
level.

**PB-278 986/5** PC A03/MF A01  
National Rural Water Association, Washington,  
D.C.  
**Rural Water and Sewer Systems Problems,  
Needs, Issues, Opportunities, and Goals: A  
Report on the Proceedings of the National Or-  
ganizational Conference of the National Rural  
Water Association (1st) Held in Oklahoma City,  
Oklahoma on April 15-16, 1976**  
Aug 76, 47p EDA-78-065

Descriptors: \*Sewers, \*Sewage treatment, \*Water  
supply, \*Meetings, Objectives, Rural areas, Popu-  
lation growth, Financing, Public health, Specialized  
training, Management, Design, Maintenance, State  
government, Legislation, Local government, Na-  
tional government.

The purpose of this report is to describe and define  
briefly the principal problems, issues, opportunities  
and goals which have a significant impact upon the  
stability and growth of rural water and sewer  
system throughout this country. The source for this  
material is the series of conference sessions held  
by representatives of eight State Rural Water As-  
sociations at the organizational meeting in Okla-  
homa City. The proceedings were heavily oriented  
toward water supply systems.

**PB-278 999/8** PC A03/MF A01  
Economics, Statistics, and Cooperatives Service,  
Washington, D.C. National Economic Analysis Div.  
**An Assessment of Anaerobic Digestion in U.S.  
Agriculture**  
Final rept.  
Ted Thornton. Mar 78, 45p\* Rept no. ESCS-06

Descriptors: \*Digestion(Decomposition), \*Anaero-  
bic processes, \*Methane, \*Agriculture, Anaerobic  
bacteria, Agricultural wastes, Cattle, Fertilizers,  
Economic analysis, Feeding stuffs, Design, Fuels,  
Digesters, Sludge, Cost analysis, Feasibility, Pro-  
duction, Assessments.  
Identifiers: Manure.

Anaerobic digestion is a biological process in  
which bacteria break down organic matter to pro-  
duce methane, partially stabilized effluent, and  
other products. Although the process has been ad-  
vocated as a source of fuel, feed, and fertilizer, its  
widespread adoption in American agriculture is  
doubtful. The cost and complexity of most diges-  
tive systems make them difficult to incorporate in  
agricultural operations. Although site specific ap-  
plications may be feasible, these will not have a  
major impact on the agricultural sector. As a  
source of energy, there is little possibility of anaer-  
obic digestion providing even a small percentage  
of national energy requirements.

**PB-279 095/4** PC A07/MF A01  
Economics, Statistics, and Cooperatives Service,  
Washington, D.C. Commodity Economics Div.  
**Estimating U.S. Livestock and Poultry Manure  
and Nutrient Production**  
Final rept.

Donald L. Van Dyne, and Conrad B. Gilbertson.  
Mar 78, 150p\* Rept no. ESCS-12

Descriptors: \*Livestock, \*Poultry, \*Agricultural  
wastes, Estimates, Animal products, Fertilizers,  
Materials handling, Production, Losses, Nitrogen,  
Phosphorus, Potassium, Recovery, Tables(Data),  
States(United States), Volume, Weight(Mass),  
Storage.  
Identifiers: \*Manure.

Estimates are developed for total manure, nitro-  
gen, phosphorus, and potassium produced by and  
available from livestock and poultry in the United  
States in 1974. Also included are estimates of the  
amount retained after losses from storage and  
waste handling systems, and estimates of the  
amounts which could be economically recovered for  
use elsewhere. A ratio of total manure produc-  
tion to acres of cropland and pastureland is devel-  
oped to provide an indication of animal manure  
concentration on a county-to-county basis in the  
United States.

**PB-279 193/7** PC A08/MF A01  
Arizona Univ., Tucson. Dept. of Systems and In-  
dustrial Engineering.  
**Appropriate Technology for Natural Resources  
Development: An Overview, Annotated Bib-  
liography, and a Guide to Sources of Informa-  
tion**  
Robert L. Bulfin, and Harry L. Weaver. 1977,  
174p  
Grant AID/ta-G-1111  
Report on Arid/Semi-Arid Natural Resources Pro-  
gram.

Descriptors: \*Technology, \*Economic develop-  
ment, \*Bibliographies, Developing countries, Or-  
ganizations, History, Industries, Agriculture, Water  
supply, Irrigation, Indexes(Documentation), Data  
sources.  
Identifiers: Appropriate technology, \*Information  
sources, \*Intermediate technology.

The purpose of this paper is to acquaint the inter-  
ested reader with the subject matter commonly re-  
ferred to as Intermediate Technology (IT). The  
paper is an attempt to capture the essence of the  
subject by providing an overview, with the bibliog-  
raphy used to obtain additional details. For those  
who wish to pursue the subject beyond the cita-  
tions presented in the bibliography, Appendix A, a  
guide to the sources of information (i.e. indices,  
journals, and practicing organizations) on Appro-  
priate and/or Intermediate Technology, is includ-  
ed. A brief history of the development of IT is  
given, followed by its thematic framework. Exam-  
ples of IT in developing countries are then present-  
ed to familiarize the reader with the breadth of ap-  
plications. The question, Is Intermediate Appropi-  
ate, is also discussed.

**PB-279 211/7** PC A20/MF A01  
International Research and Technology Corp.,  
McLean, Va.  
**An Assessment of Controlled Environmental  
Agriculture Technology**  
Final rept.  
Lawrence H. de Bivort, Theodore B. Taylor, and  
Miguel Fontes. 17 Feb 78, 476p IRT-469-R,  
NSF/RA-780024  
Contract NSF-C1026

Descriptors: \*Farm crops, \*Vegetables, \*Agricul-  
tural economics, Assessments, Economic impact,  
Environmental impacts, Agronomy, Cost analysis,  
Water conservation, Shortages, Farms, Produc-  
tion, Food storage, Solar energy, Greenhouses,  
Operating costs, Soil conservation, Employment,  
Transportation.  
Identifiers: \*Controlled environment agriculture.

Assessment of the economic, environmental,  
social, and other impacts of large scale use of  
technology for growing food inside enclosures,  
Controlled Environment Agriculture (CEA), was ini-  
tiated to alleviate the agro-food problems of en-  
vironmental degradation; shortages of arable land,  
water, and fertilizers; and unreliable production.  
Primary conclusions were: (1) Large scale use  
could alleviate these problems; (2) costs of pres-  
ent systems are too high for agronomic crops, but  
acceptable for some high value fresh vegetables;

(3) new systems can be made at lower costs and  
less total energy consumption; (4) there is a need  
to link R&D to open field agriculture, solar energy  
systems, water management, and low-cost struc-  
tures; and (5) CEA should be used with solar  
energy and water management systems for large  
communities. The study includes a conceptual  
analysis of future systems, cost evaluations, and a  
diffusion analysis of non-economic considerations.

**PB-279 379/2** MF A01  
National Research Council, Washington, D.C.  
Board on Agriculture and Renewable Resources.  
**World Food and Nutrition Study; Enhancement  
of Food Production for the United States**  
Nov 75, 186p Rept no. ISBN-0-309-02435-8  
Library of Congress Catalog Card no. 75-37121.  
Paper copy available from National Academy of  
Sciences, 2101 Constitution Ave, N.W., Washing-  
ton D.C. 20418.

Descriptors: \*Agriculture, \*Nutrition, \*Food supply,  
Research projects, Financing, Production, Nitro-  
gen fixation, Plant genetics, Recommendations,  
Pest control, Developing countries, Research  
management, Animal diseases, Livestock, Nation-  
al government, Public law, Food composition,  
Diets, Food consumption, United States.  
Identifiers: Priorities.

This report focuses on the biological, chemical,  
and physical research priorities for enhancing the  
production and improving the dependability of U.S.  
food supplies. The report points to some deficien-  
cies in our current investment in agricultural and  
food research and recommends significant in-  
creases in funding for innovative and crucial re-  
search programs. Changes are also suggested in  
the administrative procedures and resource man-  
agement practices of the Federal and state agen-  
cies concerned with agricultural, food, and nutri-  
tion research.

**PB-279 405/5** PC A15/MF A01  
Texas A and M Univ., College Station. Sea Grant  
Coll. Program.  
**Proceedings of the Annual Tropical and Sub-  
tropical Fisheries Technological Conference of  
the Americas (2nd) Held in Biloxi, Mississippi  
on April 17-20, 1977**  
Ranzell Nickelson, II. Oct 77, 344p TAMU-SG-  
78-101, NOAA-78020604  
Grant NOAA-04-6-158-44012

Descriptors: \*Fisheries, \*Tropical regions, \*Meet-  
ings, Fishing, Lobsters, Food processing, Byprod-  
ucts, Seafood, Fish protein concentrates, Food  
storage, Shrimps, Shellfish, Fishes, Marketing, Ex-  
ports, Tunas, Atlantic Ocean.  
Identifiers: Fish silage.

The 28 papers presented at the Second Annual  
Tropical and Subtropical Fisheries Technological  
Conference of the Americas, held in Biloxi, Missis-  
sippi, on April 17-20, 1977, are compiled in this  
report. Subjects vary from stock assessments, to  
processing and by-products, and production and  
marketing.

**PB-279 440/2** PC A08/MF A01  
Material Systems Corp., Escondido, Calif.  
**A Study of the Feasibility of Utilizing Solid  
Wastes for Building Materials. Phase I Sum-  
mary Report**  
B. L. Duft, H. Levine, and A. McLeod. Apr 78,  
164p\* EPA/600/2-78/091  
Contract EPA-68-03-2056

Descriptors: \*Construction materials, \*Solid waste  
disposal, \*Industrial wastes, \*Reclamation, Rein-  
forced plastics, Management planning, Composite  
materials, Reinforcing materials, Fillers, Fly ash,  
Glass, Agricultural wastes, Cellulose, Fibers, Phe-  
nolic resins, Bagasse, Cements, Starches, Lignin,  
Wood wastes, Sludge disposal, Laboratory tests,  
Performance evaluation, Furfurals.  
Identifiers: Manure, Rice hulls, Plastic recycling,  
Glass recycling, Sewage sludge, Waste recycling.

This document reports on a study to research and  
develop building materials containing organic and  
inorganic wastes and waste-derived products. A  
comprehensive literature search was conducted to



review and evaluate wastes with potential as matrices, reinforcements, or fillers in building composites. The most promising candidates were evaluated with limited laboratory studies. From these studies, two types of matrices, furfural-phenolic and inorganic, were selected for further study. Seven reinforcement candidates and five filler candidates were selected for evaluation with the two matrices.

**PB-279 445/1** **PC A09/MF A01**  
Nebraska Univ., Lincoln. Dept. of Agronomy.  
**Genetic Improvement of Productivity and Nutritional Quality of Wheat**  
Research rept. 1 Apr 76-31 Mar 77  
V. A. Johnson, and P. J. Mattern. 31 Mar 77, 183p  
Contract AID/ta-C-1093

Descriptors: \*Nutritive value, \*Wheat, \*Wheat plants, \*Plant genetics, Breeding, Proteins, Metabolism, Lysine, Photosynthesis, Nitrogen fixation, Plant physiology, Laboratory animals, Rats, Bioassay, Yield, Quality, Tables(Data), Field tests.  
Identifiers: Winter wheat plants, Spring wheat plants.

Partial contents:  
Genetics and breeding;  
Chemical and physical characterization of nutritionally improved wheats;  
International evaluation;  
Physiological studies of high yield and high protein metabolism;  
Nutritional evaluation;  
Information, germplasm exchange, technical assistance and training.

**PB-279 517/7** **PC A08/MF A01**  
Economic Research Service, Washington, D.C. Foreign Development Div.  
**Controlled Environment Agriculture: A Global Review of Greenhouse Food Production**  
Foreign agricultural economic rept. (Final)  
Dana G. Dalrymple. Oct 73, 164p Rept no. FAER-89

Descriptors: \*Horticulture, \*Greenhouses, \*Agricultural economics, \*Developing countries, Food, Production, Lettuce, Tomatoes, Vegetables, Heating, Cooling, Carbon dioxide, Soils, Irrigation, Fertilizers, Capital, Polymeric film, Fixed investments, Manpower, Operating costs.  
Identifiers: Global.

Controlled environment crop production is most nearly approached, on a commercial scale, in greenhouses. Greenhouses have been used for food production for over a century, mainly in developed regions. The introduction of plastic film during the 1950's lowered construction costs and made it possible for less affluent nations to use greenhouses. Among the newer techniques of environmental control used commercially are artificial cooling, carbon dioxide enrichment, use of artificial soil, and automated irrigation with liquid fertilizers. Greenhouse labor and capital requirements per unit of land exceed those for outdoor food crop production. Much of the work must be done by hand; there are usually few economies of scale beyond family-sized operations. Capital investments for glasshouses in developed nations commonly exceed \$100,000 per acre. The most important crops produced worldwide are tomatoes, cucumbers, and lettuce. On a global basis, environmental control via greenhouses will be increasingly important in agriculture.

**PB-279 756/1** **PC A06/MF A01**  
Economic Research Service, Washington, D.C. Foreign Demand and Competition Div.  
**The World Food Situation and Prospects to 1985**  
Foreign agricultural economic rept. (Final 1974-85).  
Dec 74, 104p\* Rept nos. FAER-98, AGERSF-16

Descriptors: \*Food supply, Production, Food consumption, Prices, Commerce, Grains(Food), Reserves, Inventories, Stock pile management, Prices, Policies, Developing countries, Agricultural economics, Nutrition, Nutritional deficiency diseases.

Identifiers: United Nations, Food aid programs, Food technology, \*World food.

Patterns of world food production, consumption, prices, and trade in the two decades prior to 1972 are analyzed in terms of their effect on the turbulent world food situation of 1972-74. Also examined are several issues that will shape developments in the next decade, including grain reserve levels, nutritional requirements, food aid, resource availability for producing food, weather, and demand for food. Projections to 1985 of world food supply and demand are included, and differences among developing countries are outlined. The analysis concludes that factors giving rise to the present world food situation are largely transitory and can be corrected. Food supplies will remain tight and their prices high for the next year or two, but in the longer term and for the world as a whole, more food can be produced per person and food production can be generally adequate to meet demand. But, substantial malnutrition will probably persist among low-income groups in the less prosperous developing countries, and special national and international programs will be necessary to help those most seriously threatened.

**PB-279 771/0** **PC A02**  
North Carolina State Univ., Raleigh. Sea Grant Coll. Program.  
**The \$6-Million Eel, or from Bait to Delicacy in Four Years**  
Karen M. Jurgensen, and Gene Crow. 1977, 8p  
UNC-SGR-115, NOAA-78032008

Descriptors: \*Eels, \*Aquaculture, Economic development, Harvesting, Prices, Demand(Economics), North Carolina.  
Identifiers: Sea Grant program.

In five years, the University of North Carolina Sea Grant College Program has spent less than \$75,000 on wild eel harvesting advisory services. What started out as an effort to tap an underutilized species has led to an increasingly sophisticated and expanding industry--one which promises even further development. There is a potential market now for eels of all sizes. Extensive worldwide demand continues, prices are good, supplies are down elsewhere. To have created a market would have taken a lot longer if, indeed, it could have done at all. The project has lived up to its goals. It has improved the financial situation of at least 350 fishermen and a number of businesses. It promises to do more.

**PB-279 775/1** **PC A07/MF A01**  
Nebraska Univ., Lincoln. Water Resources Center.  
**Water Problems in the Rural Environment; Alternative Solutions for Water Supply and Wastewater Disposal. Proceedings of a Conference Held at Lincoln, Nebraska on November 4-5, 1976**  
1978, 142p

Descriptors: \*Sewage disposal, \*Water supply, \*Rural areas, \*Meetings, Monitoring, Water quality, Water law, Policies, Social effect, Financing, Water wells, Water distribution.

The purpose of this conference was to describe the current rural water situation. Rural water supply and wastewater disposal problems, including both quality and quantity, were considered. The socioeconomic and technological aspects of alternative solutions to rural water problems and the various impacts involved in changing or improving the current situation were examined. Future research and related needs to solve various rural water problems were outlined. The conference focused on domestic and farmstead use of water and included considerations of supply systems ranging from that required for an individual home to that required for a small community.

**PB-279 982/3** **PC A02**  
Louisiana State Univ., Baton Rouge. Center for Wetlands Resources.  
**Soft Shell Crawfish as an Aquaculture Food Product**  
Jay V. Huner. Dec 77, 4p LSU-R-77-014, NOAA-78030702  
Prepared by Southern Univ., Baton Rouge, La.

Descriptors: \*Food supply, \*Crayfishes, \*Aquaculture, Animal physiology, Harvesting, Food storage, Water quality, Food processing.  
Identifiers: Reprints, Sea Grant program, Orconectes immunis, Orconectes rusticus, Orconectes virilis.

Various topics that should be considered by those interested in the production of soft shell crawfish for food are discussed. Information is given on the molting physiology, the collection and identification of premolt crawfish, its storage, handling and preservation for marketing. Artificial induction of molt is explained. Soft shell crawfish, shrimps and prawns are excellent food items. As the culture of these species expands, suitable stock for the production of soft shell animals will either continue to be available (crawfishes) or become available (shrimps and prawns). It is only a matter of time before enough persons become aware of their food value before the aquaculture industry will evaluate and subsequently implement commercial production.

**PB-280 053/0** **PC A08/MF A01**  
Economics, Statistics, and Cooperatives Service, Washington, D.C. Foreign Demand and Competition Div.  
**Alternative Futures for World Food in 1985. Volume I. World GOL (Grain-Oilseeds-Livestock) Model Analytical Report**  
Final rept.  
A. Rojko, D. Regier, P. O'Brien, A. Coffing, and L. Bailey. Apr 78, 153p\* Rept nos. AGERSF-22, FAER-146

Descriptors: \*Food supply, \*Agricultural economics, Mathematical models, Economic models, Agricultural products, Grains(Food), Oilseed crops, Livestock, Predictions, Commerce, Developing countries, Production, Exports, Demand(Economics).  
Identifiers: \*World food, \*GOL model.

The volume reports on analysis and general results of the world grain-oilseeds-livestock (GOL) model. The results point up the importance of the strong interrelationships tying together the world commodity sectors. Projections rest on a number of alternative sets of assumptions about world economic growth, trade, and food policy conditions. However, the projections indicate that regional food distribution problems are likely to persist. Moreover, the alternative which assumes lower grain yields and deteriorating climate and weather suggests the possibility of serious pressures on resources and increases in price of grain imported by the developing countries. As a whole, the developing countries' grain imports are projected to increase faster than imports in the rest of the world. Imports in 1985 are projected to range from 49 million tons under the alternative which assumes a continuation of present agricultural and trade policies, to 91 million tons under the high import demand alternative; both compare with recent levels of 30-35 million tons. Rising demand for meat and livestock products is projected under all alternatives. Growth in the commercial sectors of the world meat economy ranges from one-third to one-half above 1970 base levels.

**PB-280 100/9** **PC A05/MF A01**  
Puerto Rico Univ., Mayaguez. Water Resources Research Inst.  
**Puerto Rico's Water Resources Problems and Research Needs. Proceedings of Conference and Planning Session (1st) Held at the University Library of the Mayaguez Campus on February 14, 1974**  
Roberto Vazquez. 14 Feb 74, 95p OWRT-A-999-PR(2)  
Prepared in cooperation with Puerto Rico Dept. of Natural Resources, San Juan.

Descriptors: \*Water resources, \*Puerto Rico, \*Meetings, Agriculture, Water supply, Industrial water, Sugar crops, Water conservation, Research projects, Water pollution, Water storage, Flood control, Economic development, Virgin Islands.  
Identifiers: Water demand, Research needs.

The proceedings of a conference and planning session to identify Puerto Rico's water resources problems and research needs are presented.



Panel discussions were conducted on water for agriculture, water for development, water for industry, and on water and environmental quality R and D efforts. The agricultural discussion centered on water resource needs for sugar production and on Federal soil and water conservation programs. Economics, flood control, domestic water use problems and research needs, and Corps of Engineers water resources programs were discussed with regard to development. The panel on water and environmental quality discussed water quality problems and research needs, EPA water resources programs, USGS water resources research, and water resources in the Virgin Islands. (Portions of this document are not fully legible)

**PB-280 125/6** PC A03/MF A01  
Missouri Univ.-Columbia.

**Elimination of Pollutants by Utilization of Egg Breaking Plant Shell-Waste**  
Final rept.

J. M. Vandepopuliere, H. V. Walton, W. Jaynes, and O. J. Cotterill. Mar 78, 47p EPA/600/2-78/044

Grant EPA-S-803614

Descriptors: \*Solid waste disposal, \*Water pollution control, Industrial wastes, Feeding stuffs, Eggs, Dehydrators, Design criteria, Milling, Cost analysis, Operating costs, Chemical oxygen demand, Chemical composition, Performance evaluation, Microorganisms, Moisture content.

Identifiers: \*Land disposal, \*Egg breaking plants, Egg industry, Biochemical oxygen demand.

Egg breaking plants yield an estimated 50,000 tons of waste annually. These wastes are commonly disposed of on land. This method of disposal is becoming more difficult due to the potential for pollution of local water resources. A triple pass rotary drum dehydrator was installed at an egg breaking plant. With appropriate engineering modifications a system for producing egg shell meal from the total egg shell waste from the breaking plant was developed. This meal was utilized as a feedstuff by a local mill and incorporated into a layer diet. This diet was fed to several commercial flocks of cage layers. Appropriate data were collected to determine meal production costs, yield of meal, feed produced, feeding data, and layer flock performance. COD and BOD data were generated to determine the pollution potential of the waste were it not converted to a useful by-product.

**PB-280 161/1** PC A08/MF A01  
Philippine Council for Agriculture and Resources Research, College.

**International Consultation on Ipil-Ipil Research**  
Jan 78, 164p

Sponsored in part by Agency for International Development, Washington, D.C.

Descriptors: \*Trees(Plants), \*Arid land, \*Developing countries, \*Meetings, Tropical regions, Plant genetics, Forage crops, Production, Cultivation, Soil properties, Feeding stuffs, Utilization, Wood, Reforestation, Charcoal.

Identifiers: \*Leucaena leucocephala.

Discoveries on the multi-uses of ipil-ipil (Leucaena spp.) generated worldwide interest in the production of this versatile plant. Originating from Mexico, this species was introduced to various tropical countries especially in Southeast Asia. Undoubtedly, research on ipil-ipil production and its utilization could vary from one country to another and this could influence the formulation and priority listing of research problems areas. Participants from the United States, Mexico, Australia and Taiwan merged their expertise, experiences and ideas with Filipino scientists in an effort to: (1) put together all available information of ipil-ipil; (2) identify international potentials of the plant for forage, wood and reforestation purposes; and (3) formulate priority research areas and action to fully realize the potentials of the plant. The main objective of the publication of the proceedings of this important conference is to provide a reference for scientists and development workers in countries where ipil-ipil is or could be grown.

**PB-280 196/7** PC A03/MF A01  
Economics, Statistics, and Cooperatives Service, Washington, D.C. Commodity Economics Div.  
**The Performance and Economic Feasibility of Solar Grain Drying Systems**  
Final rept. for 1976  
Walter G. Heid, Jr. Feb 78, 39p\* Rept no. AER-396

Descriptors: \*Solar dryers, \*Crop driers, Solar drying, Drying apparatus, Farm crops, Grain crops, Agricultural engineering, Solar collectors, Cost analysis, Performance evaluation, Agricultural economics, Performance tests.

The performance and costs of eight experimental on-farm solar collectors designed to dry corn were studied. Solar drying costs were compared with the costs of owning and operating conventional grain dryers. The eight solar grain drying systems studied include: Rock heat-storage, flat-plate, inflated tube, suspended plate, wraparound, intensifier, air-supported, and multiuse.

**PB-280 252/8** PC A07/MF A01  
Economic Research Service, Washington, D.C. Foreign Development Div.

**Development and Spread of High-Yielding Varieties of Wheat and Rice in the Less Developed Nations. Edition 5**

Final rept. 1965-75  
Dana G. Dalrymple. Aug 76, 133p Rept no. FAER-95

Prepared in cooperation with Agency for International Development, Washington, D.C.

Descriptors: \*Wheat plants, \*Rice plants, \*Agricultural economics, \*Developing countries, Statistical data, International trade, Cultivation, Asia, Egypt, Iraq, India, Latin America, Philippines.

The use of high-yielding varieties (HYV's) of wheat and rice has expanded sharply in the developing nations in recent years. This report reviews the development of these varieties and documents their yearly spread in statistical terms. Major emphasis is placed on semi-dwarf (1) wheat varieties developed at the International Maize and Wheat Improvement Center in Mexico, and (2) rice varieties developed in the Philippines at the International Rice Research Institute. Semi-dwarf varieties developed in national breeding programs are also included. Data cover the 10-year period from the 1965/66 crop year, when these varieties first came into wide use, through 1974/75.

**PB-280 317/9** PC A05/MF A01  
General Accounting Office, Washington, D.C. Community and Economic Development Div.

**Redesigning Shipping Containers to Reduce Food Costs**

Report to the Congress.  
28 Apr 78, 89p\* Rept no. CED-78-81

Descriptors: \*Food packaging, \*Containerizing, \*Shipping containers, Cost engineering, Packaging, Metric system, Containers, Modular structures, Unitizing, Design, National government.

Identifiers: Department of Agriculture.

The Federal Government spent an estimated \$10.3 billion for food in fiscal year 1977. This amount can be reduced by using modularization -- a system geometrically relating the size of food shipping containers to one another. Benefits include reduced damage, increased productivity, and possibly lower prices to the consumer. Benefits from this system have been realized in European countries, but little is being done within the United States. To encourage Government-industry awareness of this efficiency opportunity, GAO recommends that: (1) The Department of Agriculture take the initiative in advancing understanding of modularization; (2) The U.S. Metric Board consider modularization in any metrication actions to change package sizes in the food industry; (3) The Congress include testimony on modularization efforts in any consideration of food marketing and prices.

**PB-280 359/1** PC A06/MF A01  
Foreign Economic Development Service, Washington, D.C.

**Survey of Multiple Cropping in Less Developed Nations**

Interim rept.  
Dana G. Dalrymple. Oct 71, 120p Rept nos. FEDR-12, AGERSF-25  
Prepared in cooperation with Agency for International Development, Washington, D.C.

Descriptors: \*Agricultural economics, \*Agriculture, \*Developing countries, History, Cultivation, Yield, Climate, Soils, Fertilizers, Pesticides, Irrigation, Water supply, Rotation, Social effect, Economic development.

Identifiers: Multiple cropping.

Multiple cropping is the practice of growing more than one harvested crop in sequence on the same piece of land in the course of one year. While an ancient technique, multiple cropping is of current importance because of the promise it holds for alleviating important problems in the less developed nations. Technological advances in developing short-season varieties have (1) broadened the area where multiple cropping is possible, and (2) increased the potential number of crops which may be grown in current multiple cropping areas. But to take advantage of multiple cropping, adequate water control must be available, along with farm chemicals in improved farm management. The report surveys the development in current status of multiple cropping in less developed nations.

**PB-280 521/6** PC A02/MF A01  
Transport and Road Research Lab., Crowthorne, (England).

**Intermediate Public Transport in Developing Countries**

Laboratory rept.  
P. R. Fouracre. 1977, 23p Rept no. TRRL-LR-772  
Also Pub. as ISSN 0305-1293.

Descriptors: \*Urban transportation, \*Developing countries, Urban development, Statistical data, Municipalities, Vehicles, Services, Great Britain.

Identifiers: Minibuses, Taxicabs, Rickshaws.

The Report presents a survey of intermediate forms of urban public transport used throughout the developing world. The controversy surrounding intermediate public transport is discussed and the more important issues and problems are identified. Brief descriptions of some examples are also presented which illustrate how these transportation systems are organized and operated. The purpose of the Report is to elucidate the significant role that intermediate public transport performs in the urban sector of developing countries. This provides the background to further research work being conducted by the Overseas Unit of the Transport and Road Research Laboratory into the efficiency of these various forms of transport. (Copyright (c) Crown Copyright 1977.)

**PB-280 662/8** PC A05/MF A01  
Agricultural Research Service, Beltsville, Md. Biological Waste Management and Soil Nitrogen Lab.

**Sewage Sludge Entrenchment System for Use by Small Municipalities**

Interim rept. for Jun 74-Jun 75  
J. M. Walker, L. Ely, P. Hundemann, N. Frankos, and A. Kaminski. Feb 78, 83p\* EPA/600/2-78/018

Descriptors: \*Land reclamation, \*Sludge disposal, \*Municipalities, Ditches, Soil properties, Drainage, Earth handling equipment, Cost estimates, Manpower, Calcium oxides, Odors, Surface water runoff, Monitoring, Viruses, Metals, Nitrogen, Feasibility.

Identifiers: Trenching.

A method of disposing of dewatered sewage sludge by entrenching it into soil was developed for small communities. Readily available and relatively inexpensive equipment was used. Included were a tractor equipped with a loader and backhoe, and dump truck or concrete mixer truck. A tractor operator and a truck driver were required. Trenches, dug with the backhoe, were 60 cm wide, 60 cm deep, and 60 cm apart. The time required to entrench 12 tons of dewatered sludge was one hour. The estimated cost of sludge incorporation



was less than \$15.00 per ton of dewatered sludge. Cost items included equipment, personnel, hauling (64 km round trip), land, drainage monitoring, and cultivation. Reuse of a previously trenched site indicated that about 2 years is the minimum satisfactory time lapse between the first and second entrenchment. Trenching of limed sludge cake can be done without odor or surface water runoff problems. Trenching is most appropriate on low quality land where surface application is not feasible.

**PB-281 073/7** PC A08/MF A01  
Hawaii Biomass Energy Study Team.  
**Biomass Energy for Hawaii. Volume II. Sugar Operations**  
Final rept.  
Feb 77, 162p Rept no. HB-2  
Also available in set of 4 reports PC E14, PB-281 071-SET.

Descriptors: \*Biomass, \*Hawaii, \*Sugars, Sources, Sugar alcohols, Process charting, Design criteria, Sugarcane, Materials recovery, Economic analysis, Electric power generation, Ethanol, Pilot plants, Harvesting, Byproducts, Bagasse.  
Identifiers: \*Energy sources, Biological energy conversion.

This volume considers sugar operations as it relates to energy sources. It covers harvesting operations, mill operations, electrical rate structures, alcohol production and general evaluation framework.

**PB-281 200/6** PC E20/MF E20  
Solar Energy Information Services, San Mateo, Calif.  
**Survey of the Emerging Solar Energy Industry - 1977 Edition**  
Justin A. Bereny. c1977, 417p\* Rept no. SEIS-77/01  
Library of Congress Catalog Card no. 77-71664.

Descriptors: \*Solar energy, \*Surveys, \*Directories, Solar air conditioning, Solar space heating, Solar water heating, Swimming pools, Solar collectors, Concentrating collectors, Flat plate collectors, Wind power, Evacuated tube collectors, Agriculture, Solar thermal power plants, Electric power generation, Photovoltaic conversion, Orbital solar power plants, Ocean thermal energy conversion, Biomass, Marketing, Economics, Legislation, Public utilities, Reviewing.  
Identifiers: National Energy Plan, Biological energy conversion.

The Survey of the Emerging Solar Energy Industry offers the first comprehensive overview of an exciting new industry that will revolutionize the way we live. It reviews the six major subdivisions of solar technology in considerable depth, i.e., heating and cooling; solar thermal electric; photovoltaics; wind energy; ocean thermal; and bioconversion. It traces the catalytic role of the federal government in spurring the development of solar technology and includes a comprehensive analysis of all state government solar-oriented legislation. The impact of solar technology on the utility industry is examined; all major solar projects of the electric utilities are listed and some of the major demonstration projects are discussed in detail. The research activities of universities, nonprofit organizations and government laboratories are identified by technical area. All leading companies (both publicly and privately owned—including a number of the 'Fortune 500') which are now active in the field are listed in the two Directories that have been incorporated as part of the Survey. Consensus market forecasts are presented and commented upon. The long range financial implications of breakthroughs in certain technologies are pointed out. (Copyright (c) 1977 Solar Energy Information Services.)

**PB-281 670/0** PC A11/MF A01  
Wampanoag Tribal Council of Gay Head, Ind., Martha's Vineyard, Mass.  
**The Wampanoag Fisheries Project: Shellfish Production Improvement at Gay Head, Martha's Vineyard, Massachusetts**  
Annual rept. no. 1.  
Apr 78, 237p EDA-78-079  
Grant EDA-01-6-01369

Descriptors: \*Shellfish, \*Aquaculture, \*Fisheries, \*Menemsha Pond, \*Economic development, Surveys, Clams, Mollusca, Mussels, Oysters, Circulation, Nutrients, Chlorophylls, Primary biological productivity, Algae, Water quality, Bacteria, Feeding stuffs, Temperature, Massachusetts.  
Identifiers: Habitats, Argopecten irradians, Mercenaria mercenaria, Mytilus edulis, Mya arenaria, Crassostrea virginica.

The Wampanoag Fisheries Project has begun a comprehensive study of shellfish environment of the Menemsha Pond complex located between the towns of Gay Head and Chilmark, Martha's Vineyard, Massachusetts. The project proposed to improve and stabilize the shellfish production on the Gay Head side of Menemsha Pond; and to provide jobs for the Wampanoag community in rearing, harvesting, processing and selling of seafood. Based on the environmental data, scallop seeding program, seafood market analysis and hatchery survey, the Project has recommended the construction of a shellfish hatchery.

**PB-282 062/9** PC A04/MF A01  
National Bureau of Standards, Washington, D.C.  
Center for Building Technology.  
**Methods for Characterizing Adobe Building Materials**  
Final rept.  
James R. Clifton, Paul W. Brown, and Carl R. Robbins. Jun 78, 63p Rept no. NBS-TN-977  
Sponsored in part by National Park Service, Washington, D.C.

Descriptors: \*Construction materials, \*Residential buildings, \*Cohesive soils, Physical properties, Mineralogy, Particle size, pH, Durability, Standards, Plastic properties, Chemical composition, Microscopy, X ray diffraction, Color, Inorganic salts, Electron microscopy.  
Identifiers: \*Adobe soils.

Methods are described for the characterization of those physical properties and mineralogical features of adobe which appear to have the most significant affect on the durabilities of adobes. These methods include determinations of color, pH, soluble salts, particle size distribution, liquid and plastic limits, and the X-ray 'fingerprint' of adobe. In addition, methods are given for the identification of the mineralogy of adobe soils and for the examination of the microfabric of adobe.

**PB-282 228/6** PC A12/MF A01  
Economics, Statistics, and Cooperatives Service, Washington, D.C. Foreign Demand and Competition Div.  
**Alternative Futures for World Food in 1985: Volume 2. World GOL Model Supply-Distribution and Related Tables**  
Final rept. 1970-85  
Anthony Rojko, Patrick O'Brien, Donald Regier, Arthur Cofing, and Linda Bailey. May 78, 254p\* Rept no. FAER-149

Descriptors: \*Food supply, Mathematical models, Grains(Food), Oilseeds, Livestock, Economic analysis, Distribution systems, Forecasting, Regions, Countries, Prices, Production, Food consumption, International trade, Imports, Developing countries, Meat, Tables(Data).  
Identifiers: \*World food, GOL model.

Detailed supply-distribution tables from the world grain-oilseeds-livestock (GOL) projections model are presented. The projections to 1985 rest on a number of alternative assumptions about world economic growth, trade, and food policy conditions. Under most of the alternatives tested, the world has sufficient capacity—whether measured in terms of physical potential or economic feasibility—to meet the grain and overall food needs of an expanding, more affluent population at real prices somewhat above base 1970 levels but below 1972-75 highs. However, the projections indicate that regional food distribution problems are likely to persist. Moreover, the alternative assuming lower grain yields and deteriorating climate and weather suggests the possibility of serious pressures on resources and higher prices for grain imports by developing countries. As a whole, the developing countries' grain imports are projected to increase faster than imports in the rest of the

world; 1985 imports are projected to range from 49 million tons to 71 million tons.

**PB-282 340/9** PC A07/MF A01  
Stanford Univ., Calif. Inst. for Communication Research.  
**Rural Development Programs Among Marginal Farmers in the Western Highlands of Guatemala**  
Jeremiah O'Sullivan-Ryan. May 78, 147p  
Contract AID/1a-c-1118  
Sponsored in part by Academy for Educational Development, Washington, D.C.

Descriptors: \*Farm management, \*Rural sociology, \*Guatemala, Farms, Disadvantaged groups, Quality of life, Farm processing, Development, Surveys, Information, Planning, Technical assistance, Developing countries, Low income groups.  
Identifiers: Training programs, \*Agricultural extension services, Adult farmer education.

The general purpose of the study was to examine the role of information and extension services in promoting change in the lives of subsistence peasants in the Highlands of Guatemala. The study was also intended to contribute to an understanding of the social and economic reality within which the Mayan Indian carries on his system of subsistence agriculture. This study concludes that a program of information and credit cannot and will not change significantly the lives of subsistence farmers in the Highlands. Agriculture extension services presently reach a group of relatively well-off farmers and even if these services were extended, the use that the small subsistence farmers can make of them is structurally limited; the changes the program may achieve through the introduction of new technological practices will not produce significant improvements in the lives of the subsistence poor.

**PB-282 460/5** PC A03/MF A01  
World Water Resources, Inc., Bethesda, Md.  
**Rural Potable Water Chlorination**  
William E. Hanford, Jr. and Alfred Long. 1970, 41p Rept no. WWRI/B-78/1  
Sponsored in part by Agency for International Development, Washington, D.C. Office of Science and Technology.

Descriptors: \*Rural areas, \*Water treatment, \*Developing countries, Chlorination, Purification, Maintenance, Gravity drainage, Chlorinators, Performance, Specifications.  
Identifiers: Appropriate technology.

The paper addresses two questions: (1) What is the most desirable form of sanitizing chemical for use in rural water supplies; and (2) What is the best overall means of getting this sanitizing agent into rural water supplies. Several chemicals and hypochlorinators are described and evaluated. In conclusion, a low-cost, dependable feeding device suitable for use in disinfecting marginal waters in the rural areas of developing countries is presented. The operation and maintenance of this device is easy for the unskilled labor in these areas; no sophisticated power source is needed to provide continuous, automatic operation; the device uses a readily available, commercial chlorine chemical that can be economically shipped, stored, and used at these points of need. An appendix is also included giving technical specifications and performance data.

**PB-282 531/3** PC A15/MF A01  
Minnesota Univ., Minneapolis. Center for Study of the Physical Environment.  
**Biomass Utilization in Minnesota**  
Research rept. Mar 75-Sep 77  
Perry L. Blackshear, Jr, Roger Aiken, and Roger A. Peterson. Nov 77, 331p  
Sponsored in part by Minnesota Pollution Control Agency, Roseville. Div. of Solid Waste.

Descriptors: \*Plants(Botany), \*Wood, \*Biomass, \*Minnesota, Anaerobic processes, Methane, Residues, Soil properties, Utilization, Substitutes, Pyrolysis, Fuels, Design criteria, Ammonia, Sugars, Assessments, Cost analysis, Feasibility, Vaporizing.  
Identifiers: \*Biological energy conversion, \*Manures, Energy sources, Manufactured gas, Synthetic fuels, Solid wastes.



# APPROPRIATE TECHNOLOGY ABSTRACTS

## Contents:

Pyrolysis;  
Crop residues as energy sources--assessing the cost and energy feasibility of direct firing;  
Cost and energy assessment of alternate uses of crop and timber residues in Minnesota;  
Anaerobic digestion of crop residues for methane generation as an adjunct to farming;  
Energy recovery on the farm by anaerobic digestion of animal manures;  
Ammonia volatilization from animal manures;  
Effect upon soil properties of utilization of plant residues for fuel energy;  
Waste cellulose conversion to sugars by cellulose enzymes.

**PB-282 650/1** **PC A12/MF A01**

Florida Inst. of Tech., Melbourne.  
**Solar Cookers for Haiti, A Feasibility Study**  
Final rept. Jul 76-Sep 77  
Thomas E. Bowman, James R. Sharber, and Joel H. Blatt. Dec 77, 273p  
Contract AID/ta-C-1333

Descriptors: \*Solar cookers, \*Haiti, Solar cooking, Design, Performance evaluation, Photographs.

The objectives of the study were to assess the feasibility of applying solar cookers extensively in rural Haiti, and to present a preliminary design for a solar cooker based on Haitian requirements. Two such designs are presented herein. (Color illustrations reproduced in black and white)

**PB-282 703/8** **PC A05/MF A01**

Small Business Administration, Washington, D.C.  
**The Study of Small Enterprise in the Economy: Summary**  
Jun 76, 79p

Descriptors: \*Federal assistance programs, \*Businesses, History, Economic impact, Technology innovation, Management, Technical assistance, Financing, Regulations, Planning, National government.  
Identifiers: \*Small businesses, Small Business Administration.

## Contents:

Private enterprise in the economy--Historical background;  
The problems inherent in a small business;  
The national interest in small business;  
The Small Business Administration--Agency mission and programs;  
A more effective program for the future--Credit and equity funding for small business enterprises;  
Innovation and new business formation;  
Government procurement regulations and practices;  
Management assistance;  
Minority enterprises and their special problems.

**PB-282 705/3** **PC A06/MF A01**

Small Business Administration, Washington, D.C. Office of Management Assistance.  
**Starting and Managing a Small Business of Your Own**  
Wendell O. Metcalf. 1973, 103p Rept no. STARTING AND MANAGING SER-1/3 ED

Descriptors: \*Businesses, \*Management, Planning, Financing, Purchasing, Prices, Management methods, Personnel management, Insurance, Records management, Regulations, Laws(Jurisprudence), Taxes.  
Identifiers: \*Small businesses, Franchising.

Contents: So you are thinking of going into business (Are you the type; What business should you choose; What are your chances of success; What will be your return on investment); Starting a new business (How much money; Where to get the money; Should you share ownership with others; Where to locate); Buying a going business (What are the advantages and disadvantages; How much to pay); Investing in a franchise (What is a franchise; What are the advantages and disadvantages);

Where to look for franchise opportunities; How to evaluate an opportunity; Managing your business (What should you know about buying; What about pricing; What selling methods should you use; What are the problems of selecting and training personnel; What other management problems will you face; How much record keeping); Looking into special requirements (To what laws and regulations will you be subject; How about taxes; What types of insurance); Setting goals and keeping up to date (How to set goals; How to keep up to date); Checklist for starting a business.

**PB-282 707/9** **PC A03/MF A01**

Small Business Administration, Washington, D.C. Office of Management Information and Training.  
**Management Audit for Small Manufacturers**  
John B. Kline. 1977, 49p\* Rept no. SMALL BUSINESS MANAGEMENT SER-29

Descriptors: \*Manufacturers, \*Businesses, \*Management, \*Auditing, Guidelines, Production, Operations, Accounting, Budgeting, Regulations, Taxes, Insurance, Financial management, Purchasing, Marketing, Inventory control, Prices, Personnel management.  
Identifiers: \*Small businesses, \*Management audit.

The activities of management require frequent evaluations designed to reveal the operating and financial condition of a business. The best known and most formal of these are prepared by a qualified accountant. These audits are prepared according to a format which is well-known and acceptable to those concerned with financial condition of businesses. Such statements, however, are not adequate to provide what management needs to develop efficient methods of control and direction for the operational activities of a business. To facilitate operational control, it's desirable to provide ways in which management can (1) identify activities that should be observed, (2) establish standards of measurement, and (3) provide suggestions for making improvements. The management audit is an outline for self-appraisal in which the owner-manager answers a series of questions about typical business operations. The material in this booklet was designed for a small manufacturer; each area is applicable to manufacturing activity. Overall, however, the technique could be applied to almost any enterprise in which functional operations are a critical factor in efficiently producing goods or services. The following areas are covered: production and operations, plant and equipment, accounting, budgeting and expense control, cash management, management and organization, laws, regulations, and taxes, risk and insurance, credit management, systems and procedures, outside consultants and resources, inventory control and management, purchasing, marketing and sales promotion, work and time standards, pricing, and research and development.

**PB-282 708/7** **PC A07/MF A01**

Small Business Administration, Washington, D.C. Office of Management Information and Training.  
**Financial Control by Time Absorption Analysis--A Tool for Profit Control**  
Cole D. Neff. 1975, 143p Rept no. SMALL BUSINESS MANAGEMENT SER-37

Descriptors: \*Businesses, \*Financial management, Control, Profits, Estimates, Losses, Prices, Manufacturing, Services.  
Identifiers: \*Small businesses.

Time-absorption analysis is a technique that can be used by all types of businesses for profit control. In this booklet, the author uses a step-by-step approach to introduce this concept and show the way for its adaptation to a particular business. The following topics are discussed: A step toward higher profits; Uses of the new method; General principles; Detailed procedure for the time-absorption method; Profit or loss estimation; Setting prices; Financial analysis of the business; Good financial control; Retail-wholesale business; Manufacturing; Service business; and Construction and contracting.

**PB-282 722/8** **PC A06/MF A01**

Small Business Administration, Washington, D.C.

**The Starting and Managing Series. Volume 24. Starting and Managing a Small Shoestore**  
William A. Rossi. 1974, 109p

Descriptors: \*Businesses, \*Management, Planning, Purchasing, Manufactures, Imports, Financial management, Operating costs, Sales, Profits, Inventory control.  
Identifiers: \*Small businesses, Small stores, Retail stores, \*Shoe stores.

## Contents:

Are you ready;  
Makeup of the footwear industry;  
What kind of store;  
Selecting the right location;  
Financing the store;  
Merchandise buying and inventory control;  
Markons and markdowns;  
Operating costs and expenses;  
Profits and profits control;  
The selling program;  
Store management;  
Launching the new store;  
For further information.

**PB-282 725/1** **PC A03/MF A01**

Small Business Administration, Washington, D.C.  
**Small Business Management Series No. 4. Third Edition. Improving Material Handling in Small Business**  
1969, 44p

Descriptors: \*Businesses, \*Materials handling, \*Management, Equipment, Storage, Cost engineering, Packaging, Industrial engineering, Plant layout, Workplace layout, Efficiency, Organizing.  
Identifiers: \*Small businesses.

The booklet discusses the basics of the handling function, and describes the array of equipment available and its capabilities. It tells how to lay out a plant's workplaces and to organize its labor to develop an efficient handling system; it describes some techniques for assuring that the investment in the equipment yields a profit. The following topics are discussed: What is material handling; Selecting material handling equipment; Organizing for material handling; Analyzing material handling problems.

**PB-282 726/9** **PC A04/MF A01**

Small Business Administration, Washington, D.C.  
**Small Business Management Series No. 15. A Handbook of Small Business Finance**  
Jack Zwick. 1975, 69p

Descriptors: \*Businesses, \*Financial management, \*Handbooks, Management planning, Assets, Accounting, Working capital, Financing, National government.  
Identifiers: \*Small businesses, Small Business Administration, Venture capital, Business loans.

## Contents:

What is financial management;  
Financial statements;  
Ratio analysis of financial statements;  
The different types of financing;  
Unsecured borrowings for working capital;  
Secured working capital financing;  
Secured growth capital financing;  
The Small Business Administration;  
SBC's and other sources of venture capital.

**PB-282 727/7** **PC A03/MF A01**

Small Business Administration, Washington, D.C.  
**Small Business Management Series No. 3. Third Edition. Human Relations in Small Business**  
Martin M. Bruce. 1969, 42p

Descriptors: \*Businesses, \*Personnel management, Industrial relations, Personnel development, Motivation, Morale, Appraisals, Selection, Incentives.  
Identifiers: \*Small businesses.

The subject of human relations is as old as history. In the business world, human relations involves finding and selecting a working staff, developing workers, and guiding and motivating them in the direction of gaining management's goals. Well-



planned action is much more valuable than a problem-solving approach. Worker-manager relations become more important than ever. It is the supervisor's job to set the climate for the work group. Any man who manages a plant gets the work done through people. The key to accomplishing this lies at least in part in the broad and complex field called human relations, which is the subject of this booklet. The topics discussed are the following: Human relations in small business--why and how; Worker morale; Starting right--personnel selection; Orientation and induction; Training; Continuing personnel relations.

**PB-282 730/1** **PC A04/MF A01**  
Small Business Administration, Washington, D.C.  
**Small Business Management Series Number 31. Third Edition. Management Audit for Small Retailers**  
John W. Wingate, and Elmer O. Schaller. 1977, 67p\*

Descriptors: \*Businesses, \*Management, \*Auditing, Guidelines, Public relations, Personnel management, Supervision, Inventory control, Budgeting, Questionnaires, Planning, Purchasing, Prices, Publicity, Financial management, Insurance, Records management, Taxes.  
Identifiers: \*Small businesses, \*Management audits, Small stores, Retail stores.

The booklet is designed to meet the needs of the small owner-manager. The approach used is a do-it-yourself technique. The manager does the examining; the answers are private; and none of the intimate facts about the business will be revealed to an outsider. However, it is advisable to compare this self-appraisal with the views of others in whom the manager has confidence. In the present audit, there are 170 questions. The manager's answers to them will give a good indication of how well he or she is doing the planning, organizing, directing, coordinating, and controlling that the business needs. Moreover, the questions the manager cannot answer affirmatively should direct attention to areas which previously have not been given much thought. And, in most instances, from this attention will come the stimulation needed to develop good management practices for these areas. The questions have been divided into 18 sections to cover the essential parts of retail management. These sections are the following: Introduction to the management audit, a look at yourself and your ability to grow, customer relations, personnel management and supervision, merchandise inventory control, budgetary control and productivity, buying, pricing, advertising and promotion, display, equipment and layout, cash and finance, credit, insurance, accounting records, taxes and legal obligations, planning for growth, and publications dealing with managing a retail business.

**PB-282 731/9** **PC A05/MF A01**  
Small Business Administration, Washington, D.C.  
**Small Business Management Series Number 36. Training Salesmen to Serve Industrial Markets**  
Kenneth Lawyer. 1975, 91p

Descriptors: \*Marketing, \*Personnel development, \*Businesses, Sales, Manufacturers, Coordination, Management, Specialized training.  
Identifiers: \*Small businesses.

The booklet discusses the role of sales in the overall marketing program of a small manufacturer. It offers suggestions that salesmen can use in servicing industrial customers and provides the owner-manager with specific material to use in a training program. This booklet is issued as part of the management publications program of SBA's Office of Management Information and Training. It discusses the following topics: The successful small firm is customer oriented; Coordinated marketing, for profit; The salesman's job; Training your salesmen; Buying is decision-making--Selling is sound guidance; Selling as a service.

**PB-282 733/5** **PC A02/MF A01**  
Small Business Administration, Washington, D.C.

**Small Business Management Series Number 1. Third Edition. An Employee Suggestion System for Small Companies**  
Donald Wilhelm, Jr, and C. W. Ufford. 1964, 23p

Descriptors: \*Businesses, \*Management, Employees, Recommendations, Improvement, Management planning, Opinions.  
Identifiers: \*Small businesses, \*Employee suggestion systems.

Suggestion systems are for everyone. Small companies and large, employers and employees, even customers--all benefit. For the small-business manager, a suggestion system can cut costs, increase efficiency, and build better employer-employee relations. For employees, it can bring a chance to earn extra money and, perhaps more important, the realization that they are members of the team--that the company is interested in the total contribution they can make and not just in their capacity as producing machines. For customers, suggestion systems mean better products or services. 'An employee suggestion system for small companies' explain the basic principles for starting and operating a successful suggestion system. It warns of various pitfalls to be avoided and gives examples of suggestions submitted by workers through company suggestion systems. The following areas are discussed: Theory of the suggestion plan; Essentials of a good suggestion system (Appoint an administrator, Appoint a suggestion committee, Employ task teams; Provide suggestion boxes and bulletin boards; Provide suggestion blanks or forms; Provide suitable initial awards; Make sure of followup; Provide additional awards); Additional pointers (Files; Complaints; Duplicate suggestions; Unclaimed awards; Delayed adoption of ideas; Eligibility; Ideas from outside sources; Employee buildup of ideas; Patents; Thought provokers; Advice and publications); Installing and operating the system; Simplifications for the very small company; Problems in 'selling' the suggestion plan; What to expect--Periodic re-selling of the plan.

**PB-282 739/2** **PC A03/MF A01**  
Small Business Administration, Washington, D.C.  
**Small Business Management Series No. 32. Financial Recordkeeping for Small Stores**  
Robert C. Ragan. 1976, 42p

Descriptors: \*Businesses, \*Financial management, \*Records management, Taxes.  
Identifiers: \*Small businesses, \*Small stores.

The author has designed this basic recordkeeping system primarily for the small store owner-manager or prospective owner whose business does not justify hiring a trained, full-time bookkeeper. This system will accomplish three purposes: (1) Maintain a record of all transactions of the business; (2) protect the assets of the business from errors, fraud, and just plain carelessness; and (3) provide a basis for business planning by showing the results of past decisions and furnishing the facts needed for future decisions. But this system will not accomplish these purposes automatically. To be fully useful, a bookkeeping system must be adapted to the needs of the individual business. And then, it can only be as useful as it is up to date and accurate. The information it records must be applied, not just in the preparation of tax returns, but in the day-to-day operation of the business. The following topics are discussed: The why, what, and how of records (Records--for the government or for yourself; Building materials for your record-keeping system; Methods and equipment); The money comes in--and goes out (The change and petty cash fund, The daily summary of sales and cash receipts, Writing the checks); Lining up the records (The sales and cash receipts journal, The cash disbursements, purchases, and expense journal); Getting set for monthly financial statements (Reconciling your bank statement, Recording accounts payable, Merchandise inventories); The score--win or lose, and how much (The profit-and-loss statement, Departmental operating records); The shape you're in (The general ledger and the balance sheet, Steps to be taken at the end of the year); The absentee asset--accounts receivable (Recording accounts receivable, Aging your accounts receivable, Accounting for bad debts); Some special cash receipts situations (Return sales and refunds, Making purchases from cash

receipts, Cashing customers' checks, Redeeming coupons); Depreciation and disposal of plant assets (Imputing depreciation of property and equipment, Recording the purchase and depreciation of plant assets, Recording the sale, trade-in, or junking of plant assets); Here they come--taxes (Collecting and recording sales taxes, Payroll records and payroll taxes, Income and self-employment taxes).

**PB-282 746/7** **PC A13/MF A01**  
Indiana Univ. at Bloomington. International Development Research Center.  
**Systems Tools for Project Planning**  
Peter Delp, Arne Thesen, Juzar Motiwalla, and Neelakantan Seshardi. 1977, 286p\* Rept no. IS3N-0-89249-021-7  
Sponsored in part by Midwest Universities Consortium for International Activities, Inc., and Agency for International Development, Washington, D.C.

Descriptors: \*Project planning, \*Systems analysis, Systems management, Project control, Flow charting, Critical path method, Management methods, Matrix games, Planning, Evaluation, Gaming models, Computerized simulation, Histograms, Forecasting, Benefit cost analysis, Cost effectiveness, Developing countries.  
Identifiers: Planning programming budgeting.

Designing development projects requires some form of systems approach. If any plan is to succeed, the factors that will probably determine the outcome must be identified, and their relationships must be established. There will always be surprises as implementation proceeds, for our ability to predict and control the future is limited. The object of planning and design is to keep those surprises at a minimum. A systems approach, properly used, can serve this aim. The examples draw on a broad range of problems and situations confronting project planners in the development fields, ranging from education and health to agriculture and economic policy. Most of the examples refer to a developing country which (for convenience) has a widely varying climate and diverse ecological zones. The population is mostly agrarian. The tools included in this volume fall into a number of categories--generating ideas; assessing qualitative factors; defining objectives; describing complex relationships; analyzing complex processes; accounting for alternative outcomes; forecast and prediction; analyzing projects; and planning, controlling, and evaluating projects. Clearly, many techniques could be included in more than one category. For example, computer simulation models could be used for the last six purposes listed. It is presented in analyzing complex processes because that is the most basic use of computer simulation. Each tool is designed to stand alone as a source of information for a decision maker, as an aid to the analyst, and as a catalyst for multidisciplinary design teams. The tool description provides a basis for action and/or the evaluation of actions by others.

**PB-282 835/8** **PC A15/MF A01**  
Midwest Universities Consortium for International Activities, Inc.,  
**Institution Building: A Source Book**  
Final rept.  
Melvin G. Blase. 1973, 331p  
Contract AID/csd-3392

Descriptors: \*Technical assistance, \*Developing countries, \*Bibliographies, Management planning, Agriculture, Community development, Businesses, Education, Government, Commerce, Organizations.  
Identifiers: \*Institution building, Public administration.

Contents: A descriptive bibliography of the central literature on institution building--The essential core of the literature; Selected contributions to the literature (Case studies classified according to type of institution--Agriculture, Business Administration, Community development, Cooperatives, Educational institutions, Government operations, Planning organizations, Public administration, Trade union, Youth); Cross-sectional analysis of institutions; Other relevant literature (Analytic reviews, Conference proceedings, Methods of analysis, Position papers, General), Supporting literature; Key concepts and definitions (Institutions and the de-



velopment process, Divergent definitions of institutions, Institutions, values, and ideology, Institution building process, Institution variables, Linkages and transactions, Institutionalization, Technical assistance in institution building, Systems, strategies, and tactics, Miscellaneous concepts and definitions; Relationships among concepts (Micro and macro aspects of institution building).

**PB-282 836-T** PC A02/MF A01  
Indiana Univ. at Bloomington. International Development Inst.  
**Approaches to the Design of Agricultural Development Projects. A Program of Advanced Studies in Institution Building and Technical Assistance Methodology Design Study**  
Walter Schaefer-Kehnert. Jan 77, 18p Rept no. ISBN 0-89249-023-3

Descriptors: \*Developing countries, \*Agricultural economics, Project planning, Research projects, Economic factors, Objectives, Translations, West Germany, Methodology.

The author identifies three possible approaches to the design of agricultural development projects—three different ways of specialization, by sector, by function, and by area. As a necessary step in responding, the author presents a set of six factors which appears to have important effects upon the chances for a project's success. The result is a cogent set of statements to guide those who would design projects, and do so with the opportunity to choose from among alternative arrangements.

**PB-282 839/0** PC A13/MF A01  
Indiana Univ. at Bloomington. International Development Research Center.  
**Designing and Managing Basic Agricultural Programs**  
Earl M. Kulp. 1977, 289p Rept no. ISBN-0-89249-018-7  
Sponsored in part by Midwest Universities Consortium for International Activities, Inc., and Agency for International Development, Washington, D.C.

Descriptors: \*Management, \*Agricultural economics, \*Developing countries, Mathematical models, Systems analysis, Yield, Objectives, Marketing, Supply(Economics), Linear programming, Manpower, Decision making, Income, Optimization, Improvement, Financing, Project planning.

Distilling the experience of those countries which have successfully modernized basic agriculture, this volume presents a new delivery system strategy and the techniques for managing it. The system of concern is the whole complex of basic analytical concepts, policy, strategy, tactics, institutions, and procedures for providing all the necessary services that will induce and enable peasants to modernize, or to change from peasant to farmer. This volume presents essential management tools, the concepts underlying these tools, and a series of quantitative techniques and fairly rigorous decision tools.

**PB-282 860/6** PC A13/MF A01  
Indiana Univ., at Bloomington. International Development Research Center.  
**Science Development: The Building of Science in Less Developed Countries**  
Michael J. Moravcsik. 1976, 287p Rept no. ISBN 0-89249-008-0  
Sponsored in part by Midwest Universities Consortium for International Activities, Inc., and Agency for International Development, Washington, D.C.

Descriptors: \*Developing countries, \*Technology, Education, Manpower, Research, Policies, Planning, Government, Scientists, Development.  
Identifiers: \*Research and development, State of the art.

The book is concerned with the deliberate and systematic development of scientific capability in developing countries. The book is a 'summary of the state of the art in science development,' a collection, distillation, and generalization of an accumulated body of experience. It appears to be the first book on the subject, though the literature on science development has become quite extensive. A valuable feature of this book is the list of 500 publi-

cations on various aspects of science development, many of them summarized in the text. Moravcsik argues that science must be developed in developing countries if the desirable goals of a higher standard of living, an independent economy, political and military power, and liberation from a subsistence existence are to be achieved. Domestic science education is, in his opinion, the best way to produce the needed scientists, with strong emphasis on quality as well as quantity. Special attention must be given to retaining competent scientific manpower. He asserts that scientific communication is perhaps the most important tool of science, and that the international scientific communication system is strongly biased against developing countries. There are internal problems of communication as well: while many developing countries have the correct ratio of basic to applied research, connections between the two are not developed. Hence the effectiveness of each, particularly of applied research, is greatly lessened. He maintains that improvement of quality in applied research and the establishment of links between basic and applied should be the primary targets of attention. The best method of allocating funds, he says, is a mixture of individual grants based on merit and institutional grants distributed equally. In developing countries much applied research is poorly done. However, some applied research is well done but has no effect: the linkages between the research and production sectors are so poor that research results never reach the places where they are needed. What are the institutional requisites of science. How can the linkages be established which will enable scientists to participate effectively in their country's development. Presented are a great deal of information on science development, a set of recommendations, and an enthusiastic call for involvement.

**PB-282 941/4** PC A09/MF A01  
Tanzania National Scientific Research Council, Dar es Salaam.  
**Workshop on Solar Energy for the Villages of Tanzania, Held at Dar es Salaam, Tanzania on August 11-19, 1977**  
1978, 177p  
Contract AID/csd-2584  
Sponsored in part by National Research Council, Washington, D.C. Board on Science and Technology for International Development.

Descriptors: \*Solar energy, \*Tanzania, \*Meetings, Solid waste disposal, Biogas process, Wind power, Windmills, Photovoltaic power generation, Electric power generation, Water supply, Solar stills, Solar drying, Refrigerating, Solar cooling systems, Utilization, Reviews.

The seminar/workshop's purposes were: (1) to review the state-of-the-art of small-scale solar energy devices, including both the technical and economic aspects of their utilization; and (2) to suggest short- and long-range projects using solar devices in the villages, with particular emphasis on recommendations for implementation.

**PB-282 954/7** PC A03/MF A01  
Aspen Inst. for Humanistic Studies, Colo.  
**Reach for Global Fairness: United Nations Conference on Science and Technology for Development. Some Suggestions for Participation by Nongovernmental Groups**  
Mary L. Wolff. c1977, 38p Rept no. ISBN-0-915436-61-2

Descriptors: \*Economic development, \*Technology innovation, Research, Developing countries, Technology transfer, Development, Planning, Sociology, International relations, Economic factors, Food, Energy, Industries, Political science, Production, Consumption.  
Identifiers: Global, United Nations, Needs, Transnational enterprises.

Today, a world-wide revolution of fairness is taking place in which longstanding inequalities are no longer tolerable. The less developed countries are reaching for equal rights, opportunities, and resources. Their search will intensify as communications make the relative economic positions of nations and groups increasingly visible. The developed countries are striving to meet the challenge of eliminating inequality without exacerbating their

own economic problems. The planned 1979 United Nations Conference on Science and Technology for Development (UNCSTD) represents one probe in the search for a new economic order. The primary aim of the Conference, as described by the UN Panel of Experts on Science and Technology in April, 1975, is to enhance the rate of development of the underdeveloped countries and thus increase their contribution to world production and their share of world consumption. It should aim, the Panel said, for 'a conjunction of efforts for development which would integrate the policy-makers, decision-makers, economic and social planners with the scientists and technologists.' (Copyright (c) by the Aspen Institute Program on Science, Technology and Humanism, 1977.)

**PB-283 249/1** PC A04/MF A01  
Woods Hole Oceanographic Institution, Mass.  
**Investigative Research and Management of Effluent from Secondary Waste Water Treatment Utilizing a Marine-Aquaculture System for the Removal of Inorganic Nutrients**  
Final rept. 15 May 74-30 Apr 75  
John H. Ryther. 1975, 60p NSF/RA/E-75-264  
Grant NSF-GI-43884

Descriptors: \*Aquaculture, \*Waste water reuse, \*Sewage treatment, Pilot plants, Oysters, Lobsters, Flatfishes, Algae, Nitrogen, Shrimps, Removal, Growth, Performance evaluation.  
Identifiers: \*Tertiary treatment.

A combined waste recycling-marine aquaculture system capable of complete nitrogen removal from treated domestic wastewater has been developed and tested on a pilot-plant scale over a one-year period. Effluent from secondary sewage treatment, mixed with seawater, is used to grow unicellular marine algae in large, continuous-flow, outdoor mass cultures. Harvest from the algae cultures is fed to oysters and other filter-feeding bivalve molluscs and to secondary crops of flounder or lobsters. Dissolved wastes produced by the animals are assimilated by cultures of commercially valuable seaweeds. Successful cultures of unicellular algae, mostly diatoms, and seaweeds have sustained over long periods of time. Bivalve mollusc culture was unsuccessful during the first year of operation. An alternative nitrogen-removal system consisting only of seaweeds fed a continuous flow of secondary sewage effluent mixed with seawater has also been evaluated.

**PB-283 768/0** PC A04/MF A01  
Biospherics, Inc., Rockville, Md.  
**Bioconversion of Saline Water. Phase I Report**  
31 Mar 78, 58p P-7705-25, NSF/RA-780066

Descriptors: \*Desalting, \*Algae, Feasibility, Economics, Sodium, Cultures(Biology), Chlorides, Salinity, pH, Concentration(Composition), Sludge, Temperature, Energy conservation.  
Identifiers: Sewage sludge, Procedures, Phenol/dinitro, Toxic substances.

Experiments were conducted on the use of algae for removal of salt from water in an attempt to develop an economically feasible, low energy method for the conversion of saline water. Primary project objectives are: (1) to undertake a literature search; (2) to select and obtain algal cultures; (3) to culture algae in sufficiently large volumes for test purposes; (4) to determine suitable methods for evaluation of media and cellular sodium concentrations; and (5) to test various environmental factors for their effect on algal sodium uptake and excretion. The literature search was completed, stock algal cultures were obtained and grown in relatively large culture volumes. Techniques for monitoring cell sodium levels were evaluated for the most efficient means of removing external sodium and for digestion of the cells prior to sodium analysis. Environmental changes indicated in the literature search and which could be easily manipulated were made in attempts to induce uptake/release of sodium from algal cells. Factors selected for experimental manipulation were: pH, salinity, temperature, light vs. dark conditions, addition and depletion of energy sources, addition of toxic compound, and addition of sewage sludge. No significant uptake or excretion of sodium or chloride were obtained in the algal species studied when the selected environmental manipulations



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were made, with the exception of a possible uptake of sodium when the algal culture was studied in the presence of activated sewage sludge.

**PB-283 811/8** PC A12/MF A01  
Illinois Univ. at Urbana-Champaign. Dept. of Plant Pathology.

**An Annotated Bibliography of 'Macrophomina phaseolina' 1905-1975**

Ankar D. Dhingra, and James B. Sinclair. Jul 77, 251p\*

Prepared in cooperation with Universidade Federal de Viscosa, Minas Gerais (Brazil).

Descriptors: \*Bibliographies, \*Plant diseases, \*Fungi, Abstracts, Parasitic plants, Plants(Botany), Soybean plants, Farm crops, Trees(Plants), Plant pathology, Plant ecology.

Identifiers: \*Macrophomina phaseolina, Glycine max.

The bibliography was begun in 1970 as a working file of the literature concerned with charcoal rot of various plants, particularly soybean (*Glycine max* (L.) Merr.) and the causal fungus, *Macrophomina phaseolina* (Tassi) Gold. Only recently, except for its occurrence on bean (*Phaseolus vulgaris* L.) and jute (*Corchorus capsularis* L.), was the importance of this fungus as a serious pathogen of crop plants and trees fully appreciated. Because this fungus attacks under environmental conditions usually unfavorable for plant growth, it was considered a weak parasite or merely a saprophyte causing little or no significant damage. However, its seriousness on economic plants throughout the world was more fully recognized during the 1970's. There is now increased interest in the study of this fungus as a plant pathogen. Therefore, the principal purpose of this bibliography is to provide a handy reference to mycologists and plant pathologists interested in this fungus and the diseases it causes.

**PB-283 958/7** PC A15/MF A01  
Volunteers for International Technical Assistance, Inc., Schenectady, N.Y.

**Village Technology Handbook (Manual de Tecnologia para la Comunidad)**  
1972, 342p

Descriptors: \*Developing countries, \*Handbooks, \*Community development, Rural areas, Economic development, Crafts, Water resources, Sanitary engineering, Irrigation, Construction materials, Roads, Food, Snails, Washing, Heating.  
Identifiers: Village technology.

Village development takes on special importance in the light of the fact that 80% of those who live in less developed countries live in villages. This handbook is aimed at helping villagers to master the resources available to them. The general topics covered include water transport, storage, and purification; latrines; Bilharziasis control; Irrigation and road-building; Poultry raising; Silage; Storing food at home; Storing vegetables and fruit for winter use; How to salt fish; Concrete construction; Bamboo construction; Glues; Solar water heater; Washing machines; Cookers and stoves; Home soap making; and Bedding.

**PB-283 965/2** PC A13/MF A01  
Wisconsin Univ.-Madison. Coll. of Agricultural and Life Sciences.

**Non-Conventional Proteins and Foods: Proceedings of a Conference Held at the University of Wisconsin-Madison on October 18-20, 1977**

Harlow J. Hodgson, and Howard W. Ream. Oct 77, 292p\* NSF/RA-770278  
Grant NSF-AER77-10185

Descriptors: \*Meetings, \*Protein, \*Food, Nutrition, Nutritive value, Food composition, United States, Food analysis, Food industry, Seeds, Tables(Data), Methodology, Flavor, Animals.

The Non-Conventional Proteins and Foods Program aims to create the technology for increasing the capacity of the United States to produce proteins and other food materials from non-conventional sources on an economically competitive basis. In order to promote exchange of information between grantees and potential users of their re-

sults, a grantees/users conference was conducted. Topics relating to protein from seeds included: (1) elimination of objectionable flavor component in Soya Protein products; (2) production of protein isolates and concentrates from oilseed flours using industrial ultra filtration and reverse osmosis systems; (3) enzymatic hydrolysis of vegetable protein; (4) Jojoba seed meal as an animal feed; (5) breeding, domestication, and utilization of the Buffalo Gourd; and (6) use of linear programming.

**PB-284 204/5** PC A16/MF A01  
International Council of Scientific Unions, Bangalore (India). Committee on Science and Technology in Developing Countries.

**Technical Information Services for Developing Countries**

Apr 77, 359

Sponsored in part by Agency for International Development, Washington, D.C. Prepared in cooperation with Indian Inst. of Science, Bangalore.

Descriptors: \*Information systems, \*Meetings, \*Information services, Developing countries, Librarians, Libraries, Problem solving, Rural areas, Urban areas, Information centers, India, Computer networks, Policies.

Identifiers: Appropriate technology.

ICSU (International Council of Scientific Unions)/COSTED (Committee on Science and Technology in Developing Countries)—has organized this Seminar on 'Technical Information Services for Developing Countries' with the hope that it will enable scientists and librarians to discuss urgent problems of developing countries and how suitable methods can be evolved to tackle such problems. The information services that are now available are not geared to tackle such problems as they do not even cater to the needs of more than 80% of the rural population. At several informal gatherings during the seminar this topic had come up and over 100 librarians and scientists that were present contributed their ideas as to how this can be rectified. Scientists and librarians from Sri Lanka, Bangladesh, Malaysia, Thailand, Singapore and India participated in the Seminar and presented views regarding problems pertaining to their countries.

**PB-284 392/8** PC A19/MF A01  
Environmental Protection Agency, Cincinnati, Ohio. Office of Water Program Operations.

**Methods for the Determination of Chemical Contaminants in Drinking Water - Participants Handbook**

John D. Pfaff. Nov 77, 429p\* Rept no. EPA/430/1-78/008

Descriptors: \*Potable water, \*Water analysis, \*Manuals, Instructional materials, Chemical analysis, Education, Metals, Silver, Cadmium, Chromium, Lead(Metal), Mercury(Metal), Arsenic, Seleni-um, Water pollution, Inorganic nitrates, Organic compounds, Fluoride, Barium, Chlorine, Pesticides, Herbicides, Turbidity, Laboratory equipment, Regulations.

Identifiers: \*Water pollution detection, Drinking water.

This laboratory manual is designed to contain analytical procedures for all parameters listed in the National Interim Primary Drinking Water Regulations (NIPDWR). Some procedures may be carried out by operators or laboratory technicians with little or no experience (chlorine, turbidity, fluoride, nitrate) while other parameters require understanding and experience in using sophisticated analytical equipment (atomic absorption, gas chromatography). Parameters included are procedures for silver, cadmium, chromium, lead, mercury, arsenic, selenium, nitrate, fluoride, barium, chlorine, turbidity, pesticides, herbicides. It is written in a step-by-step format.

**PB-284 681/4** PC A07/MF A01  
Futures Group, Inc., Glastonbury, Conn.

**A Technology Assessment of Vegetable Substitutes for Animal Protein in Human Food. Volume 1. The Study**

H. S. Becker, R. Richmond, E. W. Lusas, and S. P. Clark. Mar 78, 136p\* 352-46-21/01, NSF/RA-780070

Contract NSF-C-ERS77-19549

Prepared in cooperation with Texas A and M Univ., College Station.

Descriptors: \*Technology assessment, \*Vegetables, \*Food, \*Substitutes, Food consumption, Food chemistry, Legislation, National government, Grains(Food), Oilseeds, Leguminous plants, Potatoes, Tables(Data), Proteins, Diets, Human nutrition, Recommendations.

The report encompasses a detailed technology assessment of vegetable substitutes for animal protein in human food. The potential exists for vegetable protein to be an important substitute for animal protein in the human diet, but the substitution must take place in areas where consumption of animal protein is or could be high. Vegetable protein is being used in the United States as analogs, ingredients, and extenders of meat and dairy products. Studies have indicated that over the next 10-15 years, emphasis will be placed on using vegetable protein as a meat extender, rather than a direct analog. Federal legislation will continue to be highly important, and most likely will be directed towards the technology and development of new vegetable protein products, rather than influencing consumer purchasing patterns. Several factors are involved in substituting vegetable protein, one of the most important of which is the form the substitution should take. A recommendation is made for a complete technology assessment, which should include all important technological and socio-economic factors.

**PB-284 682/2** PC A04/MF A01  
Futures Group, Inc., Glastonbury, Conn.

**A Technology Assessment of Vegetable Substitutes for Animal Protein in Human Food. Volume 2. Appendices**

H. S. Becker, R. Richmond, E. W. Lusas, and S. P. Clark. Mar 78, 72p\* 352-46-21/02, NSF/RA-780071

Prepared in cooperation with Texas A and M Univ., College Station.

Descriptors: \*Technology assessment, \*Vegetables, \*Food, \*Substitutes, Proteins, Diets, Human nutrition, Food consumption, Food chemistry, Legislation, National government, Tables(Data).

The potential exists for vegetable protein to substitute importantly for animal protein in the human diet in the United States. A detailed technology assessment design of vegetable substitutes is the primary intent of this study. Phase I assesses the validity of accomplishing the research and then describes in detail the approach to the technology assessment of (a possible) Phase II. In this volume, Appendices A and B contribute to that assessment. In Appendix A, human physiology and the need for protein is addressed in discussions of metabolism and daily protein requirements and the impact of changes in protein intake. Appendix B includes the results of a mini technology assessment. This assessment of vegetable substitutes for animal protein as human food addresses: (1) factors important to food-consumption patterns; (2) historic food-consumption patterns; (3) important future sources of vegetable protein, including the influence of technology, legislation, and other factors; (4) potential impacts of vegetable substitutes; and (5) potential policy implications.

**PB-284 742/4** PC A03/MF A01  
Minnesota Legislature Science and Technology Project, St. Paul.

**Parameters for Legislative Consideration of Bioconversion Technologies**

Tom P. Abeles, and Janna R. King. Feb 78, 45p NSF/RA-780196  
Grant NSF-ISP76-02379

Descriptors: \*Fuels, \*Bioconversion, \*Ethyl alcohol, \*Ethanol, Minnesota, Fermentation, Sugar beets, Grain crops, Cellulose, Wood, Manufacturing, Agricultural wastes, Solid waste disposal, Nebraska, Recommendations, Planning, Biomass. Identifiers: \*Gasohol.

Included in this report and the minibrief which accompanies it are conclusions and recommendations that evolved from the examination of various models of biomass production of nonpetroleum



fuels. This included the Nebraska Grain and Alcohol Program. It was determined that it was neither economically nor energetically wise at this time for Minnesota to commit itself to a gasohol program modeled after Nebraska's program. Instead of adopting the single source, large scale Nebraska model, it was concluded that Minnesota should do the pilot and demonstration plants for the production of ethanol on the small scale (farm or local co-op size), and encourage the utilization of a variety of feedstocks such as, sugar beets, grains and celulosic residues.

**PB-284 990/9** **PC A18/MF A01**  
Midwest Research Inst., Kansas City, Mo.  
**A Technology Assessment of Biological Substitutes for Chemical Pesticides**  
Final rept.  
Edward W. Lawless, Rosmarie von Ruemker, Gary L. Kelso, Kathryn A. Lawrence, and James D. Maloney. Dec 77, 419p\* NSF/RA-770508  
Contract NSF-C349

Descriptors: \*Pesticides, \*Pest control, \*Technology assessment, Hazardous materials, Substitutes, Reviews, Surveys, Regulations, National government, Public policy, Public health, Ecology, Benefit cost analysis, Utilization, Forecasting, Economics.  
Identifiers: \*Biological pest control.

A preliminary comprehensive technology assessment has been made of the potential 'biological substitutes' for chemical pesticides. The authors identified a group of pest control technologies that would not depend on extensive first-choice reliance on conventional chemical pesticides, and made the assessment for this group. The assessment began with a survey of the driving forces of using pest control, in general, and of the reasons why biological and related methods might be substituted for chemicals. A review was made of the types of pest problems that major pesticide user groups have, and of the approaches they use to control various pests. A review also was made of those government regulations that have been developed to control the use of chemical pesticides and of those that might apply to the proposed use of biological and related methods. Studies were made of the current state of development, production, and extent of use of the chemical pesticides, and of the human health environmental, economic, and other benefits or disbenefits and controversies that accompany this usage. Two scenarios were developed reflecting alternative growth patterns through the year 1990 for both chemical and biological methods. Additional information on the general approach to this technology assessment is given in Appendix A.

**PB-285 097/2** **PC A06/MF A01**  
Institute of Medicine, Washington, D.C.  
**Strengthening U.S. Programs to Improve Health in Developing Countries**  
Final rept.  
Apr 78, 115p IOM-78-03, HRP-1003715  
Contract DHEW-287-78-0097-EGP

Descriptors: \*Developing countries, \*Health care, Migrations, Maternal and child health services, Health resources, Financing, Programs, Recommendations, United States, Design, Foreign countries, Tables(Data), Communities, Economic development, Population growth, Females, Health education, Primary health care, Environments, Management, National government, Policies, Organizational structure, Nutrition, Mental health, Infectious diseases, Oral diseases, Abnormalities, Socioeconomic factors.  
Identifiers: Women, HRP/AD, HRP/JB, HRP/MEK, HRP/AA, HRP/JBA.

The report contains a series of recommendations by the study committee about the design of programs in international health, urging that U.S. (1) assist less developed countries to strengthen their own capacity to deal with their health problems, (2) work collaboratively with host country organizations, (3) make realistic and sustained commitments to international health projects, and (4) coordinate activities with international agencies such as the World Health Organization. An examination of statutory policy and organizational framework now used by the U.S. government in international

health programs led the committee to identify four major problems that must be resolved; (1) inadequate access by the government to major U.S. sources of health science expertise, (2) skimpy support of research and development on major health problems in developing countries, (3) scattered agency responsibility for decisions on international health activities, and (4) inadequate organizational arrangements for policy development. The committee makes three general recommendations for reassignment of responsibilities to resolve the problems.

**PB-285 717/5** **PC A10/MF A01**  
Synergy Consultation Services, Saratoga, Calif.  
**Alternative Futures Planning**  
James L. Creighton. Aug 76, 215p

Descriptors: \*Water supply, \*Planning, \*California, Benefit cost analysis, Evaluation, Substitutes, Citizen participation, Public opinion, Demand(Economics), Financial management, Decision making, Feasibility.  
Identifiers: \*Water demand, Lake County(California), Napa County(California), Yolo County(California), Solano County(California), \*Alternative planning, Scenarios.

This report describes the development and application of planning procedures which involve the public in projecting alternative futures and then provide a method of evaluating alternatives in an effort to protect, rather than foreclose, the options represented by the alternative futures. These planning procedures were applied as a study of the total water needs of four California counties--Lake, Napa, Yolo, and Solano.

**PB-285 734/0** **PC A05/MF A01**  
General Accounting Office, Washington, D.C. International Div.  
**Agency for International Development's Housing Investment Guaranty Program**  
Report to the Congress.  
6 Sep 78, 88p Rept no. ID-78-44

Descriptors: \*Federal assistance programs, \*Developing countries, \*Shelters, Low income groups, Financing, Foreign countries, Project management, Housing studies, National government.  
Identifiers: Agency for International Development, Loans.

The report describes the operation and accomplishments of the Agency for International Development's Housing Investment Guaranty Program in helping developing countries to meet the shelter needs of their poor. The review provides an evaluation of the Housing Investment Guaranty Program and identifies some of the problem areas in the planning and management of housing development assistance. The report makes recommendations to help the Agency for International Development improve its efforts to provide shelter assistance to the developing countries.

**PB-285 764/7** **PC A02/MF A01**  
Department of Housing and Urban Development, Washington, DC. Office of International Development, Washington, DC.  
**Basics of Concrete**  
Ideas and methods exchange.  
Nov 60, 25p Rept no. IME-49  
Prepared in cooperation with Agency for International Development, Washington, DC.

Descriptors: \*Concretes, Air entrained concretes, Portland cements, Concrete construction, Masonry cements, Prestressed concrete, Ready mixed concrete, Concrete finishing, Admixtures.  
Identifiers: Developing country applications.

Concrete, when properly prepared and used, is one of the most versatile of building materials, and is used to some extent throughout the world in the production of housing. Failures occur when the simple rules essential to the production of good quality buildings of concrete or concrete products are ignored. The material contained herein consists of a series of articles on good practice in the preparation and use of concrete and concrete masonry which appeared in the September and November 1957 issue of the NAHB Journal and are

reproduced with the permission of the National Association of Home Builders.

**PB-285 766/2** **PC A04/MF A01**  
Department of Housing and Urban Development, Washington, DC. Office of International Affairs.  
**A Systematic Approach to Basic Utilities in Developing Countries**  
Ideas and methods exchange.  
May 74, 64p Rept no. IME-70  
Prepared in cooperation with Agency for International Development, Washington, DC.

Descriptors: \*Sewage disposal, \*Water supply, \*Developing countries, Design, Construction, Water distribution, Distribution systems, Constraints, Hydraulics, Roads, Standards, Chlorination, Pavements, Water quality, Sewers, Water wells, Lagoons(Ponds), Septic tanks, Pipes(Tubes).  
Identifiers: Water pollution standards.

Partial contents:  
Providing water to a community;  
The sewage disposal system;  
The road system;  
Planning and managing basic utilities;  
Systematic analysis;  
The water supply system;  
The sewage disposal system.

**PB-285 768/8** **PC A03/MF A01**  
Department of Housing and Urban Development, Washington, D.C. Office of International Affairs.  
**Prefabricated Concrete Components for Low-Cost Housing Construction: 407 Building Design and Construction, Prefabrication**  
Ideas and methods exchange.  
Jun 70, 40p IME-59

Descriptors: \*Houses, \*Prefabrication, \*Concrete construction, Developing countries, Design, Construction, Assembling.  
Identifiers: \*Low cost housing, Developing country application.

The system of construction described in this publication was developed originally in Surinam by Mr. Joseph Coulam under the U.S. technical assistance program and later refined under the Agency for International Development program of technical cooperation with Barbados. Although the publication deals in part with the adaptation of this system to the construction of small movable dwellings known in Barbados as 'Chattel Houses', the system is just as useful in building low-cost, permanently located dwellings. The system provides simplicity, durability, and low-cost, and appears to be adaptable for use in aided self-help programs generally.

**PB-285 769/6** **PC A04/MF A01**  
Department of Housing and Urban Development, Washington, D.C. Office of International Affairs.  
**Strengthening Urban Administration in Developing Countries: With Emphasis on Latin America**  
Ideas and methods exchange.  
Jul 71, 74p IME-67

Descriptors: \*Urban planning, \*Developing countries, \*Latin America, Local government, Management, Development, Planning, Urbanization, Government policies, Legislation, Taxes, Fiscal policies.  
Identifiers: Urban growth, Developing country application.

The complex problems of managing the massive acceleration of urban growth in the developing countries while at the same time improving the quality of urban services and renewing the obsolete urban structure of the older cities poses administrative, legislative, and financial demands without precedence in the developed countries. In this publication, PADCO, Inc. attempts to summarize the main problems facing Latin American countries in urban administration and to indicate the implications affecting urban development and planning. Each Latin American country has evolved its own set of administrative, legislative, and financial tools for dealing with urbanization. This fact makes it difficult to generalize both con-



cerning experience and recommendations for improvement. It is hoped, however, that this overview of the central issues will prove useful in providing the planner and urban administrator with a better understanding of how his own work is affected by the national, regional and local context in which he operates. The root causes of many day-to-day problems to be faced by urban administrators may not be within their immediate control at all, but rather stem from inadequate or incomplete national policy and legislation. The importance of establishing the national framework for guiding urban development is a recurring theme of this publication.

**PB-285 907/2** **PC A04/MF A01**  
United Nations Children's Fund, Kathmandu (Nepal).  
**Use of Hydraulic Rams in Nepal. A Guide to Manufacturing and Installation**  
Mitchell Silver. Sep 77, 57p

Descriptors: \*Rams(Pumps), Design, Hydraulic power pumps, Water pressure, Water supply, Check valves, Assembling, Installing, Developing countries, Nepal.  
Identifiers: \*Hydraulic rams, Developing country application.

The hydraulic ram pump can be used with great effectiveness in mountain villages which are located at a higher elevation than their source of water. The hydam pump uses the power of falling water to pump a small portion of that water uphill. It requires absolutely no fuel or electricity, only water pressure. The pump was developed about 200 years ago, and the beauty of the hydam lies in its simplicity. There are only two moving parts which are lubricated by the water itself. This manual hopes to show that anyone with a minimal amount of mechanical aptitude can survey, design and build a hydraulic ram from locally available parts, and do any necessary maintenance.

**PB-285 908/0** **PC A04/MF A01**  
Department of State, Washington, DC. Foreign Service Inst.  
**Intermediate Technology: An Informal Survey**  
Peter W. Askin. 1976, 64p  
Proceedings of Senior Seminar in Foreign Policy (Eighteenth Session).

Descriptors: \*Technology, \*Meetings, Developing countries, Concepts, Economic development, Industries, Investments, Attitudes, Reviews, Technical assistance, Foreign policy, Philippines, Indonesia, Sri Lanka, International relations.  
Identifiers: \*Intermediate technology, Developing country application, Appropriate technology, Industrialization, Case studies.

Contents:  
The concept (Some definitional problems);  
Some LDC attitudes and applications (The Philippines, Indonesia, Sri Lanka);  
On the role of international assistance.

**PB-285 909/8** **PC A08/MF A01**  
Texas Transportation Inst., College Station.  
**Handbook for Building Homes of Earth**  
Lyle A. Wolfskill, Wayne A. Dunlop, and Bob M. Callaway. 1977, 163p  
Prepared for Agency for International Development, Washington, DC. Sponsored in part by Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.

Descriptors: \*Houses, \*Construction materials, \*Soils, Soil classification, Soil compacting, Soil stabilization, Soil tests, Manufacturing, Foundations, Developing countries, Handbooks.  
Identifiers: \*Earth construction, Developing country application, Adobe blocks, Pressed earth blocks.

This manual describes broadly the kinds of soil that are found in various parts of the world and tells what can be expected of them. It then tells what is best to do with each of them, alone or in combination with others, to make them good enough to use or make them better with the use of stabilizers. Then, it explains which of the three general kinds of earth construction is best for use with the kinds

of soil available. It also describes simple tests anyone can perform that tell the builder how well he is succeeding in what he is trying to do. After chapters on picking out places to build, how to make a good foundation for any kind of house, and how to build a roof, the manual has separate chapters on adobe, rammed earth, and pressed block construction.

**PB-285 956/9** **PC A06/MF A01**  
Idaho Univ., Moscow. Forest, Wildlife and Range Experiment Station.  
**Aquaculture Techniques: Water Use and Discharge Quality**  
G. W. Klontz, Irvin R. Brock, and John A. McNair. Apr 78, 120p OWRT-A-054-IDA(1)  
Contract DI-14-34-0001-8014

Descriptors: \*Fisheries, \*Waste water, \*Aquaculture, \*Water pollution, Test methods, Feeding stuffs, Rates(Per time), Diets, Oxygen, Dissolved gases, Growth, Fresh water fishes, Size measurement, Temperature, Production, Efficiency, Solids, Predictions, Replacing, Computer programs, Fishes.  
Identifiers: IRV computer program, Animal populations, OWRT computer program.

The objectives were to develop and test methods of predicting waste product generation from aquaculture facilities. Factors chosen for testing were (1) feeding rate; (2) diet efficiency; (3) growth rate; (4) population density; (5) water replacement time; (6) oxygen consumption; (7) fish size; and (8) water temperature. Significant results are: (1) The identification of factors not only involved with the generation of waste products from an aquaculture facility, but also having the potential of affecting the production of an aquaculture facility; (2) The development of a practical method for determining oxygen consumption of fish in varying controlled environmental conditions; (3) The development of a computerized program for fish growth in optimized loading conditions of population density and water replacement time; (4) The development of a method to predict more accurately the anticipated growth rate of a group of fish; (5) The development of a method to predict the solids, both settleable and suspended, produced daily by a group of fish being held in known conditions.

**PB-285 963/5** **PC A04/MF A01**  
New Mexico State Univ., University Park. Water Resources Research Inst.  
**Water Treatment for Small Public Supplies**  
D. B. Wilson, H. G. Folster, G. Kramer, S. Hanson, and W. Boyle. May 78, 74p WRRI-095, OWRT-T-0009(7515)(1)  
Contract DI-14-34-0001-7515

Descriptors: \*Potable water, \*New Mexico, \*Water supply, \*Water treatment, Electrodialysis, Design, Osmosis, Fluid filters, Membranes, Selection, Construction, Operations, Project planning, Objectives, Performance evaluation, Residential buildings, Cost engineering, Brines, Ground water, Regulations.  
Identifiers: Reverse osmosis.

Approximately 800 community-type public water supplies in New Mexico are initially affected by the regulations adopted by the U.S. Environmental Protection Agency under the Safe Drinking Water Act. The project described is primarily the selection, design, construction, and operating procedures for a portable demonstration water treatment system using reverse osmosis and electrodialysis to provide information to small New Mexico communities for improving their drinking water supplies to meet existing regulations. The project's specific objectives are to develop operating conditions and information for an engineering evaluation of reverse osmosis and electrodialysis and their secondary support processes, to develop specific cost data, to extend available water treatment technology in the area of single solute removal from drinking water containing a large number of ionic and dissolved species, to provide the necessary material for assimilation of this unit or comparable equipment into the educational activities of water supply and water treating, and to evaluate brine disposal methods in compliance with New Mexico groundwater regulations.

**PB-285 977/5** **PC A13/MF A01**  
Oregon State Univ., Corvallis. Dept. of Soil Science.  
**Utilization of Waste Heat in a System for Management of Animal Residuals to Recover and Recycle Nutrients**  
Final rept.  
L. L. Boersma, E. Gasper, J. R. Miner, J. E. Oldfield, and H. K. Phinney. Apr 78, 299p NSF/RA-780250  
Grant NSF-GI-43681, NSF-AEN74-14960-A01  
Sponsored in part by Office of Water Research and Technology, Washington, DC. and Grant NSF-AEN74-14960-A02.

Descriptors: \*Methane, \*Feeding stuffs, Algae, Bacteria, Protein, Biomass, Agricultural wastes, Nutrients, Anaerobic processes, Swine, Cost analysis, Chorella, Process charting, Design criteria.  
Identifiers: \*Solid wastes, \*Manure, \*Waste recycling, Manufactured gas, Synthetic fuels.

Major findings of an investigation into the concept of nutrient and energy recovery from a swine waste management system are reported. Algae and bacteria were used to convert swine manure into methane-rich fuel gas and supplemental protein for animal feed. Waste heat from electricity generating plants was simulated to test its value in enhancing the biological recovery of nutrients and energy. The anaerobic digestion of the manure solids removed 55 percent of the total solids. The destruction of the volatile solids was 56 percent, and the COD was reduced by 41 percent. The daily gas production averaged 1.06 cu m/kg VS removed. The gas contained 68 percent v/v CH<sub>4</sub> and 32 percent v/v CO<sub>2</sub>. The necessity to dilute the swine waste with large volumes of water in order to make the liquid phase of the manure suitable for algal growth, and the potentially high cost of harvesting and processing the algae, prompted the consideration of other management systems for the recovery of nutrients and energy from swine manure, including the culturing of yeast, micro-fungi, and fish. Architectural perspectives and plan views were developed for each management system together with schematic diagrams showing the flow of energy and materials through each system, based on the feed and energy needs and the waste discharge of 100 pigs.

**PB-285 983/3** **PC A05/MF A01**  
United Nations Children's Fund, Kathmandu (Nepal).  
**Standards and Procedures for the Design of Water Supply Systems in Rural Areas of Nepal and Bhutan**  
Technical manual  
Carl R. Johnson. 1976, 100p\*  
Prepared in cooperation with Peace Corps/Nepal.

Descriptors: \*Water distribution, \*Water supply, \*Developing countries, Manuals, Intake systems, Reservoirs, Pipelines, Design, Water quality, Feasibility, Bhutan, Embankments, Populations, Rural areas, Hydraulics, Friction, Standards, Nepal.  
Identifiers: Developing country application, \*Water demand, Instruction manuals.

This manual is especially written as a reference for persons engaged in rural water supply design and construction for the Remote Area and Local Development Department of His Majesty's Government of Nepal and its assisting agencies: UNICEF, WHO, American Peace Corps, and German Volunteer Service. The coverage of specific topics ranges from criteria and considerations for the design of certain water system features to fully developed standard designs, estimates, and specifications for other features. Design criteria are presented where standard designs cannot be practically used, while the standard designs that are included are for guide purposes only and should always be carefully scrutinized in light of the specific conditions at the construction site.

**PB-285 984/1** **PC A02/MF A01**  
Agency for International Development, Washington, DC.  
**Rural Enterprises: An Overview of the Role and Potential of Rural Enterprises to Contribute to the Employment and Income of the Rural Poor**  
Samuel Daines, Felicia Morrow, and William Rodgers. Apr 77, 19p



## APPROPRIATE TECHNOLOGY ABSTRACTS

Descriptors: \*Rural areas, \*Farm processing, \*Developing countries, \*Agricultural economics, \*Employment, \*Income, \*Manpower, \*Economic development, \*Industries, \*Food processing, \*Woodworking, \*Businesses, \*Foreign aid, \*Low income groups. Identifiers: \*Developing country application, \*Non-metropolitan areas.

As agricultural output increases, new opportunities develop for providing goods, services, and markets in rural areas. Farmers require additional farm inputs and processing and marketing facilities for outputs. In addition, rising rural incomes create new demand for consumer products. By providing a supportive environment for rural based enterprises, governments can potentially improve the welfare of rural populations and further stimulate agricultural production. The paper discusses how rural enterprises can contribute to the overall economy and what mechanisms have been used in attempts to stimulate their development.

**PB-286 018/7** **PC A03/MF A01**  
State Univ. of New York Coll. of Environmental Science and Forestry, Syracuse.  
**Utilization of Earthworms and Microorganisms in Stabilization, Decontamination and Detoxification of Residual Sludges from Treatment of Wastewater**  
Final rept. 1 Jun 76-31 May 78  
Roy Hartenstein, and Muron J. Mitchell. 1978, 34p NSF/RA-780171  
Grant NSF-ENV77-06994

Descriptors: \*Sludge drying, \*Sludge digestion, \*Sludge disposal, \*Aerobic processes, \*Invertebrates, \*Worms, \*Toxicity, \*Nematodes, \*Decomposition, \*Soils, \*Moisture content, \*Stabilization, \*Sewage treatment, \*Microorganisms.  
Identifiers: \*Sewage sludge, \*Earthworms.

Findings are presented of studies determining the role of invertebrates in sludge disposal management using four secondary-treatment domestic sludges, including an aerobic digest and anaerobic digests from three separate wastewater treatment plants. Data previously unavailable on the chemical content of the organic matter in sludge residues are disclosed. Anaerobic sludges are shown to be toxic to earthworms when Eh is low but, if applied to a mineral topsoil, are invaded sequentially by nematodes, enchytraid worms and earthworms, as the sludges become aerated increasing its Eh. Functional moisture and temperature relationships are established for sludge conversion into feces by earthworms and isopods. Earthworms placed into aerobic sludge drying beds cause accelerated sludge stabilization and enhance aerobic decomposition product production when moisture is held below a critical level. Moisture content is the major determinant of whether an aerobic or anaerobic decomposition pathway is taken. Earthworm feeding activity is shown to stimulate an increase in nematode population density which promotes an observed bacterial turnover hastening sludge decomposition and stabilization. Data on the effect of heavy metals and the presence or absence of certain enzymes are discussed. Additional studies on enzymes and decomposition processes are reported in abstract form.

**PB-286 096/3** **PC A03/MF A01**  
National Bureau of Standards, Washington, DC.  
**Factors Affecting the Durability of Adobe Structures**  
Paul Wencil Brown, Carl R. Robbins, and James R. Clifton. Jul 78, 42p Rept no. NBSIR-78-1495

Descriptors: \*Construction materials, \*Residential buildings, \*Cohesive soils, \*Weathering, \*Physical properties, \*Mineralogy, \*Particle size distribution, \*Size determination, \*X ray diffraction, \*Porosity, \*Durability, \*Moisture content, \*Inorganic salts, \*Chemical composition, \*Arizona.  
Identifiers: \*Adobe brick, \*Historic buildings, \*Historic preservation, \*Tumacacori National Monument, \*Fort Bowie National Historic Site, \*Escalante Ruin.

Adobe samples from three sites of historic interest in the State of Arizona were analyzed to determine their mineral assemblages, particle size distributions, soluble salt contents, and porosities. These analyses were accompanied by microscopic ob-

servations of polished sections and thin sections. These data were correlated with the weathering observed and it was found that soluble salt action was responsible for the deterioration of the adobe from one of the sites. The nature of the particle size distribution has resulted in the rapid deterioration of the adobe from a second site. The adobe from a third site was found to be well consolidated due to the presence of large amounts of calcite.

**PB-286 227/4** **PC A12/MF A01**  
Denver Research Inst., CO.  
**The Industrial Research Institute in a Developing Country: A Comparative Analysis**  
James P. Blackledge. 31 Aug 75, 273p  
Contract AID/csd-3316

Descriptors: \*Research, \*Industries, \*Developing countries, \*Organizations, \*Technology transfer, \*Universities, \*Technology innovation, \*Coordination, \*Management, \*Government policies, \*Promotion.  
Identifiers: \*Multinational corporations, \*Developing country application.

The study was initiated in 1970, with the hope that a pattern of operational characteristics, similarity of problems, and a uniform approach to technical assistance would emerge. The purpose behind this effort has been to provide relevant information which will help research institute managers and their senior staffs achieve stronger programs of interaction with industry, through sharing the experiences and problems of other developing country institutes confronted with similar situations. Further, it has been the author's hope that the study will assist interested persons, institutions, and organizations in the advanced countries to better understand the unique although complex problems facing the developing country institutes, and thus devise more appropriate and meaningful programs of assistance. The objectives of the study have been to: (1) Analyze a variety of approaches to industrial research which have been tried; (2) identify those factors which have contributed or inhibited effective coupling of industrial research institutes with industry and developmental interests; (3) differentiate between those types of constraints to development of viable institutes which are country-specific and those common problems which have limited the value of these institutes regardless of their geographical location. During the course of the study, some 50 research centers in 20 countries have been visited.

**PB-286 275/3** **PC A04/MF A01**  
Michigan State Univ., East Lansing.  
**A Mass Balance Study of Recycling Secondary Municipal Wastewater on Abandoned Field Ecosystems**  
Completion rept.  
Thomas M. Burton. Jul 78, 57p OWRT-A-091-MICH(1)  
Contract DI-14-31-0001-6023

Descriptors: \*Circulation, \*Irrigation, \*Waste water reuse, \*Sewage treatment, \*Phosphorus, \*Nitrogen, \*Seasonal variations, \*Inorganic nitrogen, \*Concentration(Composition), \*Nutrients, \*Harvesting, \*Soil water, \*Plant growth, \*Grasses, \*Vegetation, \*Leaching, \*Michigan.  
Identifiers: \*Land application, \*Old fields, \*Agropyron repens, \*Solidago.

An experiment on the management of a municipal wastewater land application system using abandoned fields was conducted in 1976 and 1977 on a 10-year old oldfield site on thirty-six 0.07 ha plots arranged within 6 experimental blocks. Irrigation levels of 0, 5, and 10 cm/week of secondary effluent were used. Harvest treatments included no harvest, one harvest in June, and two harvests in June and September. Mass balances were constructed for phosphorus and nitrogen for all treatments. The oldfield was very effective at wastewater renovation at all levels of irrigation and for all harvest treatments through most of the growing season. Nitrate-N concentrations in soil water leaching past the 120 cm depth remained well below the 10 mg/l drinking water standard except during September and October on the unharvested plots. Phosphorus remained at background levels on all plots at the 120 cm depth. The irrigated harvested plots were dominated by quack grass (*Agropyron repens*) while the unharvested,

irrigated plots were dominated by goldenrod (*Solidago* sp.). Vegetation response and plant species interactions are discussed.

**PB-286 361/1** **PC A08/MF A01**  
East Central Oklahoma State Univ., Ada. Animal Waste Technical Information Center.  
**Livestock and the Environment: A Bibliography with Abstracts. Volume V**  
Final rept. 1 Mar 77-28 Feb 78  
M. L. Rowe, and Linda Merryman. Jun 78, 155p\*  
EPA/600/2-78/137  
Grant EPA-R-805151

Descriptors: \*Livestock, \*Agricultural wastes, \*Industrial waste treatment, \*Bibliographies, \*Water pollution, \*Beef cattle, \*Dairy cattle, \*Sheep, \*Poultry, \*Swine, \*Anaerobic processes, \*Ventilation, \*Methane, \*Animal husbandry, \*Runoff, \*Waste disposal, \*Indexes(Documentation), \*Air pollution, \*Water pollution control, \*Abstracts.  
Identifiers: \*Feedlot wastes, \*Confinement pens, \*Waste recycling, \*Manure, \*Waste utilization, \*Biogas.

Management and research information on animal wastes has expanded in recent years. This material has appeared in such diverse sources as journal articles, conference papers, university publications, government publications, magazine articles, books or book chapters, and theses. This bibliography was compiled in order to speed the flow of information on findings in one segment of the livestock industry to other segments that could benefit from this technology. Included in this publication are the following indexes: (1) author, and, (2) animal information categories. These indexes are followed by a section of abstracts of each reference entry found in the bibliography.

**PB-286 423/9** **PC A05/MF A01**  
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.  
**Maisons en Terre (Earth for Homes)**  
Ideas and methods exchange no. 22.  
May 69, 85p

Descriptors: \*Residential buildings, \*Construction materials, \*Soils, \*Construction, \*Floors, \*Walls, \*Roofs, \*Structural design, \*Developing countries.  
Identifiers: \*Developing country application, \*Earth construction, \*Adobe construction.

This is a nontechnical paper directed to those who wish to become informed on the uses of earth and to perhaps investigate its possibilities under conditions with which they are intimately concerned. Emphasized in the paper are soils, methods of earth wall construction, earth floors, earth roofs, wall finishes, and the design of earth homes.

**PB-286 424/7** **PC A07/MF A01**  
Department of Housing and Urban Development, Washington, DC. Office of International Housing.  
**La Construction en Climat Chaud (Physiological Objectives in Hot Weather Housing)**  
Douglas H. K. Lee. May 63, 127p

Descriptors: \*Houses, \*Environmental engineering, \*Hot weather construction, \*Human factors engineering, \*Ventilation, \*Air conditioning, \*Evaporative cooling, \*Physiological effects, \*Structural design.  
Identifiers: \*Developing country application, \*Housing.

The effects of heat on man and other elements of tropical and subtropical climate are discussed. Housing is examined as a protection against the climate. Methods to reduce the conduction of radiant heat from the sun and to reduce convection of heat and humid outside air by shades, awnings, and architectural design, as well as ventilation, air conditioning, and evaporation cooling are explained. The adaption of design to accommodate alternative hot-dry and hot-humid climates and functional considerations are also reviewed.

**PB-286 425/4** **PC A06/MF A01**  
Agency for International Development, Washington, DC.



# APPROPRIATE TECHNOLOGY ABSTRACTS

## L'Eau et la Sante de l'Homme (Water and Man's Health)

Technical series no. 5  
Arthur P. Miller. 1962, 120p

Descriptors: \*Water pollution, Disease vectors, Bacteria, Cholera, Bacillary dysentery, Tularemia, Paratyphoid, Diarrhea, Poliomyelitis, Toxicity, Metals, Radioactive wastes, Cyanides, Sulfonates, Chlorides, Chloroform, Phenols, Standards.  
Identifiers: Developing country application, Water pollution standards.

This pamphlet studies bacterial and chemical water pollutants. It discusses the transmission of disease through water; cholera, dysentery, leptospirosis, paratyphoid and typhoid fever, tularemia, dracunculosis, echinococcosis, schistosomiasis, amoebic dysentery, infectious hepatitis, diarrhea, pleurodynia, poliomyelitis, and several other diseases are discussed in depth. Chemical pollution of water by arsenic, barium, cadmium, chrome, cyanide, fluoride, lead, selenium, silver, alkylbenzene, sulfonate, chloroform, chlorides, copper, iron, manganese, nitrates, phenols, sulfates, zinc, and radioactive materials are also studied in depth. International and US standards for safe water are compared.

**PB-286 426/2** **PC A06/MF A01**  
Volunteers for International Technical Assistance, Inc., Schenectady, NY.  
**Manuel Pratique de L'Equipe Rural (IV) Aménagement de la Ferme (Village Technology Handbook, Second Edition)**  
1964, 114p

Descriptors: \*Technical assistance, \*Handbooks, Farms, Developing countries, Technology, Water supply, Irrigation, Units of measurement, Community relations, Communicating, Agriculture, Food processing, Farm processing, Farm buildings, Construction.  
Identifiers: \*Villages, Developing country application.

The purpose of the handbook is to help small farm improvement and farm management in many nations through listing ideas, methods and materials that have proven useful throughout the world. The following areas are discussed: water supply, and irrigation, drainage, making of the water mains and piping from Portland cement; building of small equipment such as barrows, graders and other small equipment used for farm irrigation; food processing and conservation of agricultural products, such as desiccation of grain, conservation of vegetables for the winter, silo storage and ensilage of corn crops; and construction of farm buildings, and bamboo as a building material; health and sanitation, agriculture, food processing and preservation, housing and construction, home improvement, communications, and tables which give conversions for temperature, length, and weight.

**PB-286 428/8** **PC A04/MF A01**  
Agency for International Development, Washington, DC.  
**Les Ravageurs des Grains Entreposes (Stored Grain Pests)**  
1968, 65p

Descriptors: \*Grains(Food), \*Pest control, \*Food storage, Insects, Classifications, Beetles, Coleoptera, Borers(Biology), Worms, Mites, Blattidae, Prevention.  
Identifiers: Developing country application.

Grain destroying insects are classified and their methods of infesting grain is explained. The pest parasites are mentioned and methods of prevention of infestation gone over. Some of the insect pests studied are weevils, beetles, caterpillars, meal worms, larder beetles, serricorn beetles, borers, silverfish, cockroaches, and mites.

**PB-286 429/6** **PC A03/MF A01**  
Department of Agriculture, Washington, DC.  
**La Prevention Contre les Moustiques dans les Terres Irriguees (Mosquito Prevention on Irrigated Farms)**  
1969, 47p

Descriptors: \*Culicidae, \*Irrigation, \*Pest control, Irrigation canals, Public health, Life cycles, Rice plants, Aquaculture, Drainage, Terracing, Irrigated land, Ponds.  
Identifiers: Developing country application, Habitats.

This book tells what measures to take to control mosquitos. The nature and extent of the problem is discussed, its socio-economic and public health aspects are given. The mosquitos' biology and habitat, and problems of reconciling mosquito control with other goals such as irrigation, rice growing, and aquaculture are studied. The principal techniques of mosquito control are discussed including calculating, administering, and recording the optimal amount of water for irrigation, creating proper drainage and irrigation systems, and landscaping farm ponds.

**PB-286 431/2** **PC A04/MF A01**  
Agricultural Research Service, Washington, DC. Field Crops Research Branch.  
**La Culture du Sorgho pour la Production de Sirop (Culture of Sorgho for Sirop Production)**  
I. E. Stokes, O. H. Coleman, and Jack L. Dean. 1962, 55p

Descriptors: \*Food processing, \*Cultivation, \*Sugarcane, Plant growth, Germination, Planting, Insects, Fertilizing, Herbicides, Plant diseases, Pest control, Harvesting, Evaporators, Sugars, Molasses.  
Identifiers: Developing country application.

The production of sirup from sorghum is outlined from planting the crop to final processing. A description of the plant and its sirup is given and nine varieties of sorghum are studied in depth. Diseases and insect pests that attack sorghum and their control is also explored. Growing the crop is outlined covering the soil, crop rotation, fertilization, preparing the seed bed, seedlings, how to plant, spacing plants, herbicides, and harvesting. A detailed account of how to make the sirup is also given.

**PB-286 433/8** **PC A04/MF A01**  
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.  
**Amelioration de l'Habitat par la Promotion de l'Effort Personnel (Aided Self-Help in Housing Improvement)**  
Ideas and methods exchange no. 18  
R. Douglas Stone, George A. Spear, Jacob L. Crane, Roy J. Burroughs, and J. Robert Dodge. 1968, 75p

Descriptors: \*Houses, \*Improvement, Upgrading, Guidelines, Technical assistance, Developing countries.  
Identifiers: \*Self help, \*Self help housing, Developing country application, Home ownership.

Aided self-help is the concept of self-help plus some form of aid so as to achieve an improved product. It is a principle which is adaptive to a variety of techniques and situations; it may capitalize on unused leisure time; and it is a very effective method to encourage home ownership. This booklet is an analysis of the procedures for establishing a program of aided self-help in housing improvement in developing countries.

**PB-286 435/3** **PC A10/MF A01**  
National Planning Association, Washington, DC.  
**Le Developpement de l'Entreprise Privée Africaine (The Development of African Private Enterprise)**  
Planning pamphlet no. 120.  
Mar 64, 218p

Descriptors: \*Africa, Businesses, Industries, Services, Distributing, Foreign government, Europe, United States, Foreign aid, Economic surveys.  
Identifiers: Developing country application, \*Private enterprise.

The study concentrates primarily upon African private enterprise in industry, distribution, and the service trades. It analyzes the main problems which impede the emergence and development of modern forms of indigenous private economic ac-

tivity in the countries of tropical Africa, and describes the measures for mitigating them which could be undertaken by African entrepreneurs themselves, by their government, by the Europeans, Americans, and other private companies operating in Africa and by those providing aid to African countries. The purpose of this study is to present a reasonably comprehensive survey of the present problems and future prospects of African private enterprise.

**PB-286 436/1** **PC A13/MF A01**  
Agency for International Development, Washington, DC. Office of Science and Technology.  
**Manuel d'Horticulture Tropicale et Sub-Tropicale (Handbook of Tropical and Subtropical Horticulture)**  
Ernest Mortensen, and Ervin T. Bullard. Jun 70, 283p

Descriptors: \*Fruit crops, \*Vegetable crops, \*Trees(Plants), \*Horticulture, \*Tropical regions, Manuals, Fertilizing, Plant growth, Temperature, Insect control, Handbooks, Soil properties, Planting, Spacing, Weed control, Tables(Data), Insecticides.  
Identifiers: \*Subtropical regions, Developing country application.

This manual is written in layman's language in solving their agriculture problems. Major fruit, nut, and tree crops are discussed with emphasis on spacing, pruning, fertilizing, budding, and disease and insect control. A description is given of all major vegetables. Information is presented on seed storage, vegetable varieties, fertilizer recommendations, plants spacings, temperature requirements, soil and cultivation. Major diseases with their control are presented in a table for easy reference.

**PB-286 437/9** **PC A09/MF A01**  
Agency for International Development, Washington, DC. Office of Science and Technology.  
**Handbook of Tropical and Subtropical Horticulture**  
Ernest Mortensen, and Ervin T. Bullard. Jun 70, 197p

Descriptors: \*Fruit crops, \*Vegetable crops, \*Trees(Plants), \*Horticulture, \*Tropical regions, Manuals, Fertilizing, Plant growth, Temperature, Insect control, Plant diseases, Handbooks, Soil properties, Planting, Spacing, Weed control, Tables(Data), Insecticides.  
Identifiers: \*Subtropical regions, Developing country application.

This manual is written in layman's language in solving their agriculture problems. Major fruit, nut, and tree crops are discussed with emphasis on spacing, pruning, fertilizing, budding, and disease and insect control. A description is given of all major vegetable varieties, fertilizer recommendations, plants spacings, temperature requirements, soil and cultivation. Major diseases with their control are presented in a table for easy reference. (Color illustrations will be reproduced in black and white)

**PB-286 439/5** **PC A03/MF A01**  
Makerere Medical School, Kampala (Uganda). Dept. of Preventive Medicine.  
**Health Education of the Tropical Mother in Feeding Her Young Child**  
Derrick B. Jelliffe, and John F. Bennett. 1964, 27p

Descriptors: \*Nutrition, \*Diets, \*Nutritional deficiency diseases, Tropical regions, Developing countries, Preventive medicine, Infants, Children, Sanitation.  
Identifiers: Mothers, \*Health education, Developing country application.

Malnutrition in early childhood is the dominant problem in the developing tropical regions of the world, and, although poverty is often a vital causative factor, frequently a considerable proportion of the malnutrition seen is potentially avoidable, if already available local food resources were used to better purpose by parents. An important global target for health education is to persuade tropical



## APPROPRIATE TECHNOLOGY ABSTRACTS

mothers to feed their children in the early years of life as well as is possible with already existing available local foods. This paper is largely concerned with the education of the mother in preventing malnutrition among under-privileged children. Topics covered include breast feeding vs. artificial feeding, the transitional diet, and adult diet.

**PB-286 440/3** PC A09/MF A01  
National 4-H Tractor Program's Extension Subcommittee.  
**L'Entretien Des Tracteurs (4-H Tractor Program Learning by Doing. A Units, p1-90)**  
1978, 194p

Descriptors: \*Agricultural machinery, \*Tractors, \*Maintenance, Tractor engines, Spark ignition engines, Diesel engines, Lubrication, Carburetors, Ignition systems, Cooling systems, Safety, Instructional materials.  
Identifiers: Developing country application.

This booklet is a guide to learning the basic mechanics of tractor care which will help prevent costly breakdowns and provide greater productivity. The areas discussed in the book are tractor safety, general lubrication, oil for the engine and hydraulic system, air cleaners, carburetor adjustment, the ignition, and the cooling system. A cross-section of the gas engine is shown and discussed. It also tells how to keep a complete written record of all operating, maintenance, and repair costs of your tractor.

**PB-286 441/1** PC A05/MF A01  
National 4-H Tractor Program's Extension Subcommittee.  
**4-H Tractor Program Learning by Doing. A Units. Tractor Care Project**  
1978, 86p

Descriptors: \*Agricultural machinery, \*Tractors, \*Maintenance, Tractor engines, Spark ignition engines, Diesel engines, Lubrication, Carburetors, Ignition systems, Cooling systems, Safety, Instructional materials.  
Identifiers: Developing country application.

This booklet is a guide to learning the basic mechanics of tractor care which will help prevent costly breakdowns and provide greater productivity. The areas discussed in the book are tractor safety, general lubrication, oil for the engine and hydraulic system, air cleaners, carburetor adjustment, the ignition, and the cooling system. A cross-section of the gas engine is shown and discussed.

**PB-286 442/9** PC A04/MF A01  
National 4-H Tractor Program's Extension Subcommittee.  
**4-H Tractor Program Learning by Doing. B Units. Tractor Care Project**  
1978, 69p  
Sponsored in part by American Oil Co., New York, and Agency for International Development, Washington, DC.

Descriptors: \*Agricultural machinery, \*Tractors, \*Maintenance, Tractor engines, Spark ignition engines, Ignition systems, Manual transmissions, Valves, Steering gear, Instructional materials.  
Identifiers: Developing country application.

The purpose of this booklet is to provide an opportunity to learn the proper care of a tractor which will result in longer life, more power, and lower operating costs. This booklet makes it possible for you to learn how to do many small tractor maintenance jobs that will give you greater production and help to eliminate costly breakdowns. Topics covered include: engine ignition systems, fuel saving adjustments, valves, power transmissions, care of tires, and steering and front wheels.

**PB-286 444/5** PC A13/MF A01  
Agency for International Development, Washington, DC.  
**Petites Conserveries. (Small Canning Factories)**  
Mar 72, 295p

Descriptors: \*Food processing, \*Canning, \*Manuals, Industrial plants, Site selection, Buildings,

Plant layout, Requirements, Small businesses, Planning, Technical assistance.  
Identifiers: Developing country application.

The manual is a comprehensive collection of information on the canning of food. The manual is divided into three sections. The first section explains the many desirable results of canning and the factors which are necessary to make the establishment of a canning plant a practical venture. The second section discusses the selection of the plant site, the building requirements, and the layout of the equipment in the plant. The last section deals with the various procedures involved in canning.

**PB-286 445/2** PC A12/MF A01  
Agency for International Development, Washington, DC.  
**Small Canning Factories**  
Mar 72, 275p

Descriptors: \*Food processing, \*Canning, \*Manuals, Industrial plants, Site selection, Buildings, Plant layout, Requirements, Small businesses, Planning, Technical assistance.  
Identifiers: Developing country application.

The manual is a comprehensive collection of information on the canning of food. The manual is divided into three sections. The first section explains the many desirable results of canning and the factors which are necessary to make the establishment of a canning plant a practical venture. The second section discusses the selection of the plant site, the building requirements, and the layout of the equipment in the plant. The last section deals with the various procedures involved in canning.

**PB-286 446/0** PC A03/MF A01  
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.  
**Managing Public Rangelands: Effective Livestock Grazing Practices and Systems for National Forests and National Grasslands**  
Richard S. Driscoll. Oct 67, 37p Rept no. AIB-315

Descriptors: \*Livestock, \*Grazing land, \*National parks, \*Forest land, Management, Vegetation, Selection, Forage grasses, Water supply, Ponds, Feeding stuffs, Grassland, Animal nutrition, Range grasses, Fences.  
Identifiers: Developing country application.

This brochure presents the basic principles of various grazing practices that might be used in forests and grasslands. Topics discussed in this pictorial booklet include: salting, fencing, water development, and riding and herding.

**PB-286 447/8** PC A03/MF A01  
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.  
**L'Exploitation des Paturages (Managing Public Rangelands: Effective Livestock Grazing Practices and Systems for National Forests and National Grasslands)**  
Richard S. Driscoll. Oct 67, 38p

Descriptors: \*Livestock, \*Grazing land, \*National parks, \*Forest land, Management, Vegetation, Selection, Forage grasses, Water supply, Ponds, Feeding stuffs, Grassland, Animal nutrition, Range grasses, Fences.  
Identifiers: Developing country application.

This brochure presents the basic principles of various grazing practices that might be used in forests and grasslands. Topics discussed in this pictorial booklet include: salting, fencing, water development, and riding and herding.

**PB-286 449/4** PC A03/MF A01  
Department of Housing and Urban Development, Washington, DC. Office of International Housing.  
**Village Markets in Ghana: A Study on the Planning of Village Markets and Stalls**  
Ideas and methods exchange  
William Mann, Jr. May 65, 49p Rept no. IME-60

Descriptors: \*Technical assistance, \*Marketing, \*Ghana, Facilities, Construction, Planning, Sanitation, Distribution systems, Culture (Social sciences), Developing countries, Mass communication, Guidelines.  
Identifiers: \*Villages, \*Markets, Developing country application.

Village markets provide a great variety of necessities and luxury items to a majority of the population as well as being a center for social interaction, mass communication, and the diffusion of culture. This booklet has been written to help preserve the traditional spirit of village markets, to improve the physical make-up to better serve their intended purpose, and to offer suggestions for making them more pleasant and healthful as human surroundings. The booklet is illustrated for increased understanding.

**PB-286 450/2** PC A03/MF A01  
Department of Agriculture Extension Service, Washington, DC.  
**Comment Conserver le Poisson Salage-Sechage-Fumage (Home Curing Fish. A Guide for Extension and Village Workers in Many Countries)**  
Jul 67, 41p

Descriptors: \*Food processing, \*Fishes, Instructional materials, Developing countries, Guidelines, Technical assistance, Cleaning, Drying, Smoking, Curing.  
Identifiers: \*Villages, Developing country applications.

The information in the booklet presents ideas on how to catch and cure fish at home. The various topics discussed are catching and handling fish, how to clean fish, salting fish, how to air dry fish, how to smoke fish, and how to use cured fish.

**PB-286 451/0** PC A02/MF A01  
Department of Agriculture Extension Service, Washington, DC.  
**Home Curing Fish. A Guide for Extension and Village Workers in Many Countries**  
Jul 67, 21p

Descriptors: \*Food processing, \*Fishes, Instructional materials, Developing countries, Guidelines, Technical assistance, Cleaning, Drying, Smoking, Curing.  
Identifiers: \*Villages, Developing country applications.

The information in the booklet presents ideas on how to catch and cure fish at home. The various topics discussed are catching and handling fish, how to clean fish, salting fish, how to air dry fish, how to smoke fish, and how to use cured fish.

**PB-286 452/8** PC A04/MF A01  
National Association of Home Builders, Washington, DC.  
**Le Beton: Principes Elementaires (Basics of Concrete)**  
Ideas and methods exchange no. 49.  
Nov 60, 64p

Descriptors: \*Concretes, Air entrained concretes, Portland cements, Concrete construction, Masonry cements, Prestressed concrete, Ready mixed concrete, Concrete finishing, Admixtures.  
Identifiers: Developing country applications.

Concrete when properly prepared and used, is one of the most versatile of building materials, and is used to some extent throughout the world in the production of housing. Failures occur when the simple rules essential to the production of good quality buildings of concrete or concrete products are ignored. This pictorial booklet consists of a series of articles on good practice in the preparation and use of concrete and concrete masonry.

**PB-286 455/1** PC A07/MF A01  
Agency for International Development, Washington, DC.  
**L'Education Sanitaire (Education in Health)**  
1964, 144p



## APPROPRIATE TECHNOLOGY ABSTRACTS

Descriptors: \*Health education, \*Public health, \*Sanitation, Meetings, Schools, Children, Instructors, Health care services, Instructional materials, Attitudes.  
Identifiers: Developing country application.

The material in this publication presents the group thinking of many health workers of various professional skills, who participated in a health conference in the Philippines. This report is designed as a training aid and handy reference for the use of health workers everywhere. The functions of the health educator and public administrator in the prevention and treatment of malaria are discussed as well as the importance of educating people in the area of sanitation. The role of the health educator and public administrator in establishing a school health program to teach children and school personnel to attain and maintain good health are discussed. Methods of dealing with community attitudes in maternal and child care are explained.

**PB-286 456/9** PC A03/MF A01  
West Pakistan Range Improvement Scheme, Lahore.  
**Water Spreading Manual**  
Range management record no. 1  
Norman H. French, and Ijaz Hussain. May 64, 46p

Descriptors: \*Dikes, \*Earth dams, \*Water supply, \*Agricultural economics, Manuals, Deserts, Farm crops, Semiarid land, Forage grasses, Runoff, Flooding, Ponds, Design, Channel flow, Topography, Slopes, Water law, Ditches, Construction, Maintenance, Pakistan.  
Identifiers: Developing country application, \*Water spreading, Peak discharge.

Water spreading both for crop production and the production of additional forage for livestock has a real and practical application in many places. This booklet provides adequate knowledge to technicians for embarking upon such a project. Photographs and illustrations make this booklet an easily read and practical guide. (Color illustrations reproduced in black and white)

**PB-286 457/7** PC A04/MF A01  
West Pakistan Range Improvement Scheme, Lahore.  
**Irrigation par Deversement (Water Spreading Manual)**  
Range management record no. 1  
Norman H. French, and Ijaz Hussain. May 64, 58p

Descriptors: \*Dikes, \*Earth dams, \*Water supply, \*Agricultural economics, Manuals, Deserts, Farm crops, Semiarid land, Forage grasses, Runoff, Flooding, Ponds, Channel flow, Design, Topography, Slopes, Water law, Ditches, Construction, Maintenance, Pakistan.  
Identifiers: Developing country application, \*Water spreading, Peak discharge.

Water spreading both for crop production and the production of additional forage for livestock has a real and practical application in many places. This booklet provides adequate knowledge to technicians for embarking upon such a project. Photographs and illustrations make this booklet an easily read and practical guide.

**PB-286 459/3** PC A13/MF A01  
Caribbean Food and Nutrition Inst., Kingston (Jamaica).  
**La Nutrition de L'Enfant Dans les Pays en Voie de Developpement (Child Nutrition in Developing Countries)**  
Derrick B. Jelliffe. 1968, 281p

Descriptors: \*Developing countries, \*Nutrition, \*Children, \*Nutritional deficiency diseases, Diets, Foreign countries, Therapy, Preventive medicine, Humans, Food, Education, Indexes(Documentation).  
Identifiers: Developing country application.

In recent years international recognition has accumulated to emphasize the magnitude of the problem of childhood nutrition. This handbook will help nontechnical workers recognize the significance of

the problem of malnutrition in young children and help guide their efforts toward locally appropriate preventative and curative measures.

**PB-286 461/9** PC A03/MF A01  
Agency for International Development, Washington, DC.  
**Developpement Communautaire - Cinq Realisations Interessantes en Afrique (Five Community Development Stories Out of West Africa; Community Development Series, Volume 1, Series B)**  
Nov 62, 42p

Descriptors: \*Community development, \*Africa, Planning, Improvement, Water wells, Irrigation, Farm crops, Rice, Ghana, Nigeria, Lagos, Construction, Developing countries.  
Identifiers: \*Villages, Developing country application.

These five development success stories may inspire efforts to improve the living conditions in villages. Local participation in planning and carrying out improvements obtained good results. Successful deep wells were dug in Patuduase and Apam, Ghana, and a popular literacy campaign completed. In northern Ghana, villages built their own irrigation system for rice growing under the tutelage of development personnel. In Igan Alade, Nigeria, the villagers were inspired to build themselves an auditorium, and in Lagos, a youth club was established which was then used in self-help schemes.

**PB-286 463/5** PC A07/MF A01  
Volunteers for International Technical Assistance, Inc., Schenectady, NY.  
**Village Technology Handbook, First Edition**  
Jun 63, 143p

Descriptors: \*Tools, \*Handbooks, \*Technical assistance, Developing countries, Agriculture, Water supply, Sanitation, Health, Houses, Construction, Technology, Improvement, Community development.  
Identifiers: \*Villages, Developing country application.

The handbook has been prepared to assist village workers of developing countries in making useful tools and in acquiring helpful work techniques. It contains fifty articles that describe and illustrate various tools and techniques primarily in the fields of agriculture, water supply, sanitation and health, housing and construction, and home improvement.

**PB-286 464/3** PC A06/MF A01  
Volunteers for International Technical Assistance, Inc., Schenectady, NY.  
**Manuel Pratique de l'Equipement Rural (III). Installations Sanitaires (Village Technology Handbook)**  
Jun 63, 116p

Descriptors: \*Tools, \*Technical assistance, \*Handbooks, Developing countries, Agriculture, Water supply, Health, Sanitation, Houses, Construction, Improvement.  
Identifiers: Developing country application, Villages.

The handbook has been prepared to assist village workers of developing countries in making useful tools and in acquiring helpful work techniques. It contains fifty articles that describe and illustrate various tools and techniques primarily in the fields of agriculture, water supply, sanitation and health, housing and construction, and home improvement.

**PB-286 465/0** PC A06/MF A01  
Volunteers for International Technical Assistance, Inc., Schenectady, NY.  
**Manuel Pratique de L'Equipement Rural L'Eau au Village (Village Technology Handbook, First Edition, Pages 1-81)**  
Jun 63, 103p

Descriptors: \*Tools, \*Handbooks, \*Technical assistance, Developing countries, Water supply, Technology, Community development, Irrigation, Artesian wells, Potable water.  
Identifiers: \*Villages, Developing country application.

The handbook has been prepared to assist village workers of developing countries in making useful tools and in acquiring helpful work techniques. It contains twenty-four articles that describe and illustrate various tools and techniques in the field of water supply, irrigation, potable water, chlorination of polluted water, drilling of wells, piping and drainage and similar subjects. (Portions of this document are not fully legible)

**PB-286 467/6** PC A15/MF A01  
National Research Council, Washington, DC.  
**L'Energie et le Developpement Rural: Ressources Renouvelables et Options Techniques pour les Pays en Developpement (Energy for Rural Development: Renewable Resources and Alternative Technologies for Developing Countries)**  
1977, 331p  
Contract AID/csd-2584

Descriptors: \*Developing countries, \*Rural areas, \*Regional planning, Wind power generation, Biomass, Energy storage, Reviews, Reviewing.  
Identifiers: \*Energy source development, Solar energy conversion, Bioconversion, Wind power utilization, Hydroelectric power, Photosynthesis, Geothermal energy conversion, Developing Country Application, State of the art.

This report provides a summary of the state of the art of alternative (appropriate or soft) technologies frequently suggested as solutions to rural or individual-family energy needs. Moreover, it informs both the technologist and the planner where to go for more detailed information and what kinds of research and development are needed before a particular device or process is ready for use. Thus, it should be of considerable assistance in evaluating the potential of each energy source in each candidate situation. This is the French edition of the original report which was printed in 1976.

**PB-286 468/4** PC A21/MF A01  
National Scientific Documentation Center, Jakarta (Indonesia).  
**Selected Abstracts on Traditional Fermented Food**  
Afrida Nazir Yanwar, and Sri Budhi Saparsih. 1978, 476p\*

Descriptors: \*Food, \*Fermentation, Abstracts, Indexes(Documentation), Food preparation, Indonesia, Microorganisms, Chemical reactions, Decomposition reactions, Food processing, Nutritive value, Toxins, Rice, Grains(Food), Soybeans, Oilseeds, Fishes, Methodology, Food storage.  
Identifiers: Author indexes, Coconut, Sauerkraut, Vinegar, Cassava, Developing country application.

Contents:  
Fermented rice;  
Fermented soy beans;  
Fermented coconut press cake;  
Sauerkraut;  
Fermented fish;  
Vinegar;  
Fermented cassava.

**PB-286 469/2** PC A04/MF A01  
Wood (Richardson) and Co., New York.  
**Plant Requirements Primer: How to Start a New Factory or Shop**  
Aug 55, 61p

Descriptors: \*Technical assistance, \*Businesses, Planning, Industrial plants, Shops, Manufacturing, Workplace layout, Materials, Equipment, Personnel, Operating costs, Marketing, Sales, Capital, Profits, Instructional materials.  
Identifiers: Small businesses, Industrial growth, Industrial development, Developing country application.

The pictorial pamphlet outlines steps that should be followed in starting a new factory or shop. Its purpose is to show how ideas for a new business should be collected and presented to obtain the greatest cooperation from lending agencies, other businessmen, and from the Government. The pamphlet first shows in brief pictorial form the types of privately owned enterprises that have often been started in countries with developing in-



dustries. It then discusses the processes of industrial development and the general conditions that are necessary to industrial growth. The last section describes in some detail a typical case of a preliminary study of a new business enterprise which could culminate in its actual establishment.

**PB-286 470/0** PC A04/MF A01  
Wood (Richardson) and Co., New York.  
**Comment Creer Une Usine (Plant Requirements Primer: How to start a New Factory or Shop)**  
Aug 55, 74p

Descriptors: \*Technical assistance, \*Businesses, Planning, Industrial plants, Shops, Manufacturing, Workplace layout, Materials equipment, Personnel, Operating costs, Marketing, Sales, Capital, Profits, Instructional materials.  
Identifiers: Small businesses, Industrial growth, Industrial development, Developing country application.

The pictorial pamphlet outlines steps that should be followed in starting a new factory or shop. Its purpose is to show how ideas for a new business should be collected and presented to obtain the greatest cooperation from lending agencies, other businessmen, and from the Government. The pamphlet first shows in brief pictorial form the types of privately owned enterprises that have often been started in countries with developing industries. It then discusses the processes of industrial development and the general conditions that are necessary to industrial growth. The last section describes in some detail a typical case of a preliminary study of a new business enterprise which could culminate in its actual establishment.

**PB-286 471/8** PC A03/MF A01  
Agency for International Development, Washington, DC.  
**Power Transmissions for Cottage Industry**  
1978, 40p

Descriptors: \*Industries, \*Rural areas, Belt drives, Power transmission belts, Power supplies, Mechanical drives, Pulleys, Belts, Machine tools, Quality of life.  
Identifiers: Developing country application, \*Cottage industries.

This booklet covers the various methods of transmission of mechanical power from its source to the driven member, and the various companion devices which go to make up a suitable power transmission. The transmission elements described are limited to the simple materials which are available locally at little or no cost. Reference is made to the various sources of power which may be available in an area and to the relative economics and practicality of these sources. Only the type of equipment is discussed which may be improvised by rudimentary techniques from simple materials.

**PB-286 472/6** PC A03/MF A01  
Agency for International Development, Washington, DC.  
**Les Transmissions de Force Motrice Dans L'Artisanat Familial (Power Transmissions for Cottage Industry)**  
1978, 50p

Descriptors: \*Industries, \*Rural areas, Belt drives, Power transmission belts, Power supplies, Mechanical drives, Pulleys, Belts, Machine tools, Quality of life.  
Identifiers: Developing country application, \*Cottage industries.

This booklet covers the various methods of transmission of mechanical power from its source to the driven member, and the various companion devices which go to make up a suitable power transmission. The transmission elements described are limited to the simple materials which are available locally at little or no cost. Reference is made to the various sources of power which may be available in an area and to the relative economics and practicality of these sources. Only the type of equipment is discussed which may be improvised by rudimentary techniques from simple materials.

**PB-286 473/4** PC A03/MF A01  
Philco Corp., Philadelphia, PA. Technical Publications Dept.  
**Kerosene Devices. Technical Digest Supplement No. 8**  
Jan 61, 47p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Kerosene, \*Burners, \*Heating equipment, Lamps, Refrigerators, Safety, Combustion, Space heaters, Water heaters.  
Identifiers: Developing country application.

The report deals with the basic principals and applications of kerosene fueled devices. It is directed primarily to those who wish to become involved with the manufacture or maintenance. Emphasis is on kerosene devices intended for domestic use (heaters, lamps, refrigerators, etc.).

**PB-286 474/2** PC A04/MF A01  
Philco Corp., Philadelphia, PA. Technical Publications Dept.  
**Appareils a Kerosene (Kerosene Devices)**  
Jan 61, 69p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Kerosene, \*Burners, \*Heating equipment, Lamps, Refrigerators, Safety, Combustion, Space heaters, Water heaters.  
Identifiers: Developing country application.

The report deals with the basic principals and applications of kerosene fueled devices. It is directed primarily to those who wish to become involved with the manufacture or maintenance. Emphasis is on kerosene devices intended for domestic use (heaters, lamps, refrigerators, etc.).

**PB-286 475/9** PC A14/MF A01  
Stanford Research Inst., Menlo Park, CA.  
**Manual of Industrial Development**  
Jun 58, 320p

Descriptors: \*Economic development, \*Developing countries, \*Manufacturing, \*Industries, Economic analysis, Methods, Productivity, Manuals, Demand(Economics), Resources, Stability, Balance of payments, Capital, Income, Experience, Competition, Community relations, Attitudes.  
Identifiers: \*Industrialization, Economic status, Developing country application, Per capita income, Social attitudes.

It is the purpose of the manual to contribute to the economic progress of developing countries by helping them deal more effectively with some of the crucial development decisions that must be made. It deals with the problem of making a rational selection of specific types of manufacturing industries likely to be most effective in raising the productivity and the living level of an area under development. The manual does this by proposing a method of analysis rather than by analyzing the industrial development opportunities and problems of a particular country or region.

**PB-286 477/5** PC A03/MF A01  
Farm Credit Administration, Washington, DC.  
**Farm Credit Manual**  
A. Rudolph Ettesvold. May 66, 35p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Agriculture, \*Credit, \*Manuals, Agricultural economics, Financing, Farms, Real property, Working capital, Capital, Payment, Education, Personnel, Projects.  
Identifiers: \*Credit policies, \*Capital expenditures, Short term financing, Long term financing, Capital improvements, Finance occupations.

The manual has been prepared for the purpose of stating as simply as possible the basic principles of sound agricultural credit. These basic principles have proved to be sound and are applicable in all countries, regardless of the stage of development of their agricultural credit systems. The manual should be useful as a basis for establishing or extending training programs in all countries where an agricultural credit program is in operation or is being contemplated.

**PB-286 560/8** PC A99/MF A01  
Wisconsin Univ.-Madison.  
**Management of Small Waste Flows**  
Final rept. Jul 71-Jun 77.  
Sep 78, 854p\* EPA/600/2-78/173  
Grant EPA-R-802874

Descriptors: \*Sewage disposal, \*Sewage treatment, Constraints, Law(Jurisprudence), Residential buildings, Waste water, Industrial wastes, Assessments, Soil properties, Microbiology, Sand filtration, Septic tanks, Cost analysis, Sanitation, Fluid infiltration, Design, Operations, Management, Bacteria, Sites.  
Identifiers: Alternative planning.

This report is a compilation of laboratory and field investigations conducted at the University of Wisconsin since 1971. As its primary objective, the research program was to conceive, evaluate and develop satisfactory methods for the on-site treatment and disposal of wastewaters, regardless of the site constraints. The studies were subdivided into several categories including characterization of household and commercial wastewaters, assessment of wastewater treatment alternatives, evaluation of soils for treatment and disposal of wastewater, estimation of infiltrative capacities of soils, design and operation of alternative systems dependent upon soil design and operation of alternative systems not dependent upon soil, management of on-site disposal systems and institutional and regulatory control of on-site systems.

**PB-286 572/3** PC A03/MF A01  
Farm Credit Administration, Washington, DC.  
**Manuel de Credit Agricole. (Farm Credit Manual)**  
A. Rudolph Ettesvold. May 66, 41p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Agriculture, \*Credit, \*Manuals, Agricultural economics, Financing, Farms, Real property, Working capital, Capital, Payment, Education, Personnel, Projects.  
Identifiers: \*Credit policies, \*Capital expenditures, Short term financing, Long term financing, Capital improvements, Finance occupations.

The manual has been prepared for the purpose of stating as simply as possible the basic principles of sound agricultural credit. These basic principles have proved to be sound and are applicable in all countries, regardless of the stage of development of their agricultural credit systems. The manual should be useful as a basis for establishing or extending training programs in all countries where an agricultural credit program is in operation or is being contemplated.

**PB-286 573/1** PC A03/MF A01  
Farm Credit Administration, Washington, DC.  
**Lending to Increase Farmer's Income. A Series of Guides to Effective Use of Agricultural Credit**  
Jun 58, 31p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Agriculture, \*Financing, \*Specialized training, Personnel development, Financial management, Credit, Income, Farms, Risk, Real property, Farm crops, Services, Projects, Agricultural economics.  
Identifiers: \*Credit policies, Economic risks, Financial services, Finance occupations, Guides.

The booklet's purpose is to provide training material and encourage the development of more intensive training programs for officials and employees of agricultural credit organizations in other countries. The sections discussed in the booklet include: the man who needs credit, purposes for which loans are made, capacity of the farm to pay debts, financial strength and progress of the borrower, property and growing crops as security for loans, and loan supervision and collections.

**PB-286 574/9** PC A03/MF A01  
Farm Credit Administration, Washington, DC.



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**Le Credit Agricole Source de Prosperite (Lending to Increase Farmer's Income. A Series of Guides to Effective Use of Agricultural Credit)**  
Jun 58, 50p

Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Agriculture, \*Financing, \*Specialized training, Personnel development, Financial management, Credit, Income, Farms, Risk, Real property, Farm crops, Services, Projects, Agricultural economics.

Identifiers: \*Credit policies, Economic risks, Financial services, Finance occupations, Guides.

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**PB-286 576/4** PC A05/MF A01  
Bureau of Labor Statistics, Washington, DC. Div. of Foreign Labor Conditions.

**La Prevision Des Besoins en Main-D'Oeuvre (The Forecasting of Manpower Requirements)**  
Matilda R. Sugg, and Lloyd A. Prochnow. 1968, 96p

Descriptors: \*Manpower, \*Requirements, \*Forecasting, \*Developing countries, Demographic surveys, Methods, Populations, Population growth, Statistical analysis, Economic development, Education.

Identifiers: \*Manpower development programs, Population dynamics, Labor force estimates, Occupational surveys, Developing country application.

The handbook has been written to assist economists and statisticians in the economically developing countries in initiating and conducting studies for determining future manpower requirements in relation to anticipated development. It outlines a method of estimating future manpower requirements by occupation and industry and future training requirements for high-level occupations.

**PB-286 577/2** PC A03/MF A01  
Farmer Cooperative Service, Washington, DC.  
**Rural Cooperatives in the United States**  
Apr 63, 50p

Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Economics, \*Cooperation, \*Rural areas, Commerce, States(United States), Organizations, Economic development, Agricultural economics, Rural sociology, History, Legislation, Services, Businesses.

Identifiers: \*Cooperatives, \*Rural economics, Economic cooperation, Cooperative enterprises, Cooperative production and marketing systems.

Cooperatives have long played a significant role in the developing economy of the United States. The booklet describes the evolution of rural cooperatives in the United States and discusses the many benefits of cooperatives as well as mistakes to avoid.

**PB-286 578/0** PC A04/MF A01  
Farmer Cooperative Service, Washington, DC.  
**Les Cooperatives Agricoles aux Etats-Unis (Rural Cooperatives in the United States)**  
Apr 63, 64p

Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Economics, \*Cooperation, \*Rural areas, Commerce, States(United States), Organizations, Economic development, Agricultural economics, Rural sociology, History, Legislation, Services, Businesses.

Identifiers: \*Cooperatives, \*Rural economics, Economic cooperation, Cooperative enterprises, Cooperative production and marketing systems.

Cooperatives have long played a significant role in the developing economy of the United States. The booklet describes the evolution of rural cooperatives in the United States and discusses the many benefits of cooperatives as well as mistakes to avoid.

**PB-286 579/8** PC A02/MF A01  
Department of Agriculture Extension Service, Washington, DC.

**Building a Strong Extension Service. A Guide for Extension Administrators**  
Fred Jans. Jul 69, 17p

Descriptors: \*Federal assistance programs, \*Rural areas, \*Management training, Education, Agricultural economics, Economic development, Rural sociology, Financing, Production, Organization theory, Personnel development, Planning.

Identifiers: \*Agricultural extension services, \*Administrator guides, Rural extension, Rural farm residents, Agricultural production, Developing country application, Administrative personnel, Rural development, Organizational development.

The purpose of agricultural extension is to carry the application of science in the fields of agricultural production and family living to people who use the lands regardless of their educational level or stage in life. It also provides a good channel through which practical problems important to farm people are called to the attention of research institutions. The bulletin discusses some of the fundamental steps essential in establishing an effective extension service. It has been prepared by recognized leaders experienced in this field.

**PB-286 580/6** PC A03/MF A01  
Department of Agriculture Extension Service, Washington, DC.

**Creation d'Un Service de Vulgarisation Agricole (Building a Strong Extension Service. A Guide for Extension Administrators)**  
Fred Jans. 1969, 34p

Descriptors: \*Federal assistance programs, \*Rural areas, \*Management training, Education, Agricultural economics, Economic development, Rural sociology, Financing, Production, Organization theory, Personnel development, Planning.

Identifiers: \*Agricultural extension services, \*Administrator guides, Rural extension, Rural farm residents, Agricultural production, Developing country application, Administrative personnel, Rural development, Organizational development.

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**PB-286 581/4** PC A09/MF A01  
Bureau of Employment Security, Washington, DC.  
**Establishment of National Employment Services in Developing Countries**  
Sep 68, 197p

Sponsored in part by Agency for International Development, Washington, DC. Office of Labor Affairs.

Descriptors: \*Employment, \*Services, Consultants, Handbooks, Job analysis, Placement, Manpower, Specialized training, Skilled workers, Developing countries.

Identifiers: Employment services, Labor force, Developing country application.

This handbook is for those who undertake assignments to assist under-developed countries establish or improve their employment services. The handbook lists in logical sequence, the principal steps which would be involved in starting an employment service from the ground up. Recognizing that there may be situations in which placement service is not required but where other employment services may be, it suggests that these may

be provided in other ways than in opening costly local employment offices to accomplish the purpose.

**PB-286 582/2** PC A12/MF A01  
Bureau of Employment Security, Washington, DC.  
**El Servicio Publico de Empleos (Establishment of National Employment Services)**  
1967, 258p

Sponsored in part by Agency for International Development, Washington, DC. Office of Labor Affairs.

Descriptors: \*Employment, \*Services, Consultants, Handbooks, Job analysis, Placement, Manpower, Specialized training, Skilled workers, Developing countries.

Identifiers: Employment services, Labor force, Developing country application.

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**PB-286 583/0** PC A10/MF A01  
Bureau of Employment Security, Washington, DC.  
**Les Services Publics de l'Emploi (Establishment of National Employment Services in Developing Countries)**  
Sep 78, 204p

Sponsored in part by Agency for International Development, Washington, DC. Office of Labor Affairs.

Descriptors: \*Employment, \*Services, Consultants, Handbooks, Job analysis, Placement, Manpower, Specialized training, Skilled workers, Developing countries.

Identifiers: Employment services, Labor force, Developing country application.

This handbook is for those who undertake assignments to assist under-developed countries establish or improve their employment services. The handbook lists in logical sequence, the principal steps which would be involved in starting an employment service from the ground up. Recognizing that there may be situations in which Placement Service is not required but where other employment services may be, it suggests that these may be provided in other ways than in opening costly local employment offices to accomplish the purpose.

**PB-286 584/8** PC A05/MF A01  
Department of Housing and Urban Development, Washington, DC. Office of International Housing.  
**Physiological Objectives in Hot Weather Housing**  
Douglas H. K. Lee. May 63, 83p

Descriptors: \*Houses, \*Environmental engineering, \*Hot weather construction, Human factors engineering, Ventilation, Air conditioning, Evaporative cooling, Physiological effects, Structural design.

Identifiers: Developing country application, Housing.

The effects of heat on man and other elements of tropical and subtropical climate are discussed. Housing is examined as a protection against the climate. Methods to reduce the conduction of radiant heat from the sun and to reduce convection of heat and humid outside air by shades, awnings, and architectural design, as well as ventilation, air conditioning, and evaporation cooling are explained. The adaptation of design to accommodate alternative hot-dry and hot-humid climates and functional considerations are also reviewed.



## APPROPRIATE TECHNOLOGY ABSTRACTS

**PB-286 585/5** PC A03/MF A01  
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.  
**Mejoramiento de la Vivienda por Autoayuda Subsidiada (Aided Self-Help in Housing Improvement)**  
Ideas and methods exchange no. 18  
E. Douglas Stone, George A. Spear, Jacob L. Crane, Roy J. Burroughs, and J. Robert Dodge.  
Sep 68, 43p

Descriptors: \*Houses, \*Improvement, Upgrading, Guidelines, Technical assistance, Developing countries.  
Identifiers: \*Self help, \*Self help housing, Developing country application, Home ownership.

Aided self-help is the concept of self-help plus some form of aid so as to achieve an improved product. It is a principle which is adaptive to a variety of techniques and situations; it may capitalize on unused leisure time; and it is a very effective method to encourage home ownership. This booklet is an analysis of the procedures for establishing a program of aided self-help in housing improvement in developing countries.

**PB-286 587/1** PC A09/MF A01  
Economic Research Service, Washington, DC. Regional Analysis Div.  
**Nourrir un Monde Surpeuple. (Man, Land and Food. Looking Ahead at World Food Needs)**  
Foreign agricultural economic rept.  
Lester R. Brown. Nov 63, 180p Rept no. FAER-11-F  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Food supply, Populations, Land, Agricultural products, Grains(Food), Production, Technology, Land development, Developing countries, Regions, Food consumption, Commerce, Soybeans, Milk, Tropical regions.  
Identifiers: World food, World trade, Developing country application.

The purpose of the study is to add perspective to the world food problem. The analysis seeks to assess the magnitude and direction of the effort which must be made during the remaining four decades of this century if the projected population is to be sustained. Some of the topics discussed are population trends, land resources, agricultural problems, increasing output, and grain production.

**PB-286 588/9** PC A08/MF A01  
Economic Research Service, Washington, DC. Regional Analysis Div.  
**Man, Land and Food. Looking Ahead at World Food Needs**  
Foreign agricultural economic rept.  
Lester R. Brown. Nov 63, 162p Rept no. FAER-11  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Food supply, Populations, Land, Agricultural products, Grains(Food), Production, Technology, Land development, Developing countries, Regions, Food consumption, Commerce, Soybeans, Milk, Tropical regions.  
Identifiers: World food, World trade, Developing country application.

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**PB-286 590/5** PC A04/MF A01  
Small Business Administration, Washington, DC. Office of Management and Research Assistance.  
**Creer et Gerer une Petite Entreprise de Comptabilite (Starting and Managing a Small Bookkeeping Service. The Starting and Managing Series, Volume 4)**  
Charles H. Sevin. Jan 62, 67p

Descriptors: \*Accounting, \*Businesses, \*Management, Services, Operations, Planning, Organizing, Guidelines.  
Identifiers: Developing country application, \*Small businesses, \*Bookkeeping services.

The booklet is designed to spell out the facts about starting and managing a small bookkeeping service so that the reader can decide if he is suited to it and it to him. Both the advantages and disadvantages are discussed. Included is a guide to operating conditions in that field which spells out common problems and pitfalls as well as potential rewards.

**PB-286 591/3** PC A07/MF A01  
Small Business Administration, Washington, DC.  
**Starting and Managing a Small Restaurant. Starting and Managing Series, Volume 9**  
Paul Fairbrook. Jan 64, 127p  
Sponsored in part by National Restaurant Association, Chicago, IL., and Agency for International Development, Washington, DC.

Descriptors: \*Technical assistance, Planning, Financing, Management, Abilities, Risk, Profits, Accounting, Food services, Businesses.  
Identifiers: \*Restaurants, \*Small businesses, Franchising.

The booklet is to help prospective restaurant owners decide whether they have the basic qualifications, financing, and experience for success. It is also intended to supply them with some 'know-how,' help them avoid the pitfalls, and achieve success in case they do enter this field. It describes the advantages and disadvantages of this business, the risks involved, the personal characteristics that will contribute to success, and some of the management practices whose application is necessary for attainment of that success.

**PB-286 614/3** PC A06/MF A01  
Small Business Administration, Washington, DC.  
**Creer et Gerer un Petit Restaurant (Starting and Managing a Small Restaurant. The Starting and Managing Series, Volume 9)**  
Paul Fairbrook. Jan 64, 124p  
Sponsored in part by National Restaurant Association, Chicago, IL., and Agency for International Development, Washington, DC.

Descriptors: \*Technical assistance, Planning, Financing, Management, Abilities, Risk, Profits, Accounting, Food services, Businesses.  
Identifiers: \*Restaurants, \*Small businesses, Franchising.

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**PB-286 615/0** PC A05/MF A01  
Bureau of Labor Standards, Washington, DC. Div. of International Cooperation.  
**Role of a Labor Department in Developing Countries**  
Clara M. Beyer. Feb 64, 100p  
Prepared in cooperation with Agency for International Development, Washington, DC. Office of Labor Affairs.

Descriptors: \*Economic development, \*Government policies, \*Developing countries, \*Handbooks, Organization theory, Technical assistance, Financing, Personnel selection, Public relations, Coordination, Standards, Statistical data, Services, Industrial relations, Manpower development, Sociology, Quality of life, Economics.  
Identifiers: \*Government role, \*Government services, Information dissemination, Labor standards, Developing country application, Labor economics, Social development.

The document is a handbook for individuals working in the developing countries who may have numerous opportunities to supply information, arrange technical aid, and otherwise help in the strengthening of the labor department as part of a countries' development program. It is designed to give them an understanding of the important role which a labor department plays in social and economic development to make for a better way of life for people in the developing countries. Each of the major services for which a department is normally responsible is briefly described, with the goal of the service, the type of activities carried on, and some of the special problems encountered in developing countries identified for each.

**PB-286 616/8** PC A08/MF A01  
Bureau of Labor Standards, Washington, DC. Div. of International Cooperation.  
**Le Role d'Un Ministere du Travail Dans les Pays en Voie de Developpement (Role of a Labor Department in Developing Countries)**  
Clara M. Beyer. Feb 64, 167  
Sponsored in part by Agency for International Development, Washington, DC. Office of Labor Affairs.

Descriptors: \*Economic development, \*Government policies, \*Developing countries, \*Handbooks, Organization theory, Technical assistance, Financing, Personnel selection, Public relations, Coordination, Standards, Statistical data, Services, Industrial relations, Manpower development, Sociology, Quality of life, Economics.  
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**PB-286 617/6** PC A07/MF A01  
Economic Research Service, Washington, DC. Foreign Development and Trade Div.  
**Changes in Agriculture in 26 Developing Nations, 1948 to 1963**  
Foreign agricultural economic rept.  
Nov 65, 141p Rept no. FAER-27

Descriptors: \*Agricultural economics, \*Developing countries, Production, Output, Assessments, Fertilizers, Social change, Farm crops, Demand(Economics), Exports, Marketing, Imports, Transportation, Storage, Food processing, Manpower, Prices, Credit, Tables(Data).  
Identifiers: Developing country application.

The agricultural problems of 26 developing nations are considered; 7 of these countries are in Latin America, 4 in Africa, 4 in Europe, 7 in the Near East and South Asia, and 4 in the Far East. The levels and changes since 1948 in agricultural output and productivity in these countries are shown and the roles of major physical, economic, and social factors associated with difference in these levels and changes are identified and assessed. The contents of the study include: sources of change in crop output, land and other natural features, land tenure and size of holdings, technology, the human factor, capital and credit, demand and prices, and marketing facilities and practices.

**PB-286 618/4** PC A09/MF A01  
Economic Research Service, Washington, DC. Foreign Development and Trade Div.



# APPROPRIATE TECHNOLOGY ABSTRACTS

**Evolution de l'Agriculture dans 26 Pays en Voie de Développement, 1948 à 1963 (Changes in Agriculture in 26 Developing Nations, 1948 to 1963)**

Nov 65, 193p

Descriptors: \*Agricultural economics, \*Developing countries, Production, Output, Assessments, Fertilizers, Social change, Farm crops, Demand(Economics), Exports, Marketing, Imports, Transportation, Storage, Food processing, Manpower, Prices, Credit, Tables(Data).  
Identifiers: Developing country application.

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**PB-286 619/2**

PC A02/MF A01

Soil Conservation Service, Washington, DC.  
**An Outline for Teaching Conservation in High Schools**  
Aug 52, 24p

Descriptors: \*Natural resources, \*Conservation, \*Instructional materials, Water conservation, Land, Contour farming, Objectives.  
Identifiers: Developing country application.

This booklet is written to develop an appreciation for natural resources and to show the need for the conservation of them. It is divided into seventeen areas for the study of conservation which include the sciences, English, math, the social sciences, political science, economics, and the practical arts.

**PB-286 620/0**

PC A04/MF A01

Soil Conservation Service, Washington, DC.  
**Momento de Conservation des Ressources Naturelles (An Outline for Teaching Conservation in High Schools)**  
Aug 52, 72p

Descriptors: \*Natural resources, \*Conservation, \*Instructional materials, Water conservation, Land, Contour farming, Objectives.  
Identifiers: Developing country application.

This booklet is written to develop an appreciation for natural resources and to show the need for the conservation of them. It is divided into seventeen areas for the study of conservation which include the sciences, English, math, the social sciences, political science, economics, and the practical arts.

**PB-286 621/8**

PC A03/MF A01

Department of Health, Education, and Welfare, Washington, DC.  
**Better Nourishment for Infants and Preschool Children. A Food for Peace Guide**  
1967, 28p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Nutrition, \*Diets, \*Food preparation, Infants, Children, Developing countries, Humans, Nutritional requirements, Tables(Data), Sanitation.  
Identifiers: Mothers.

The purpose of this booklet is to place a practical guide in the hands of those in immediate charge of distributing foods to be consumed by young children in their homes or at community facilities. It is intended to help teach mothers how to use the basic commodity foods together with locally available foods in order to provide the best diet possible within their resources.

**PB-286 622/6**

PC A03/MF A01

Department of Health, Education, and Welfare, Washington, DC.  
**Ameliorer L'Alimentation de L'Enfant (Better Nourishment for Infants and Preschool Children. A Food for Peace Guide)**  
1967, 40  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Nutrition, \*Diets, \*Food preparation, Infants, Children, Developing countries, Humans, Nutritional requirements, Tables(Data), Sanitation.  
Identifiers: Mothers.

The purpose of this booklet is to place a practical guide in the hands of those in immediate charge of distributing foods to be consumed by young children in their homes or at community facilities. It is intended to help teach mothers how to use the basic commodity foods together with locally available foods in order to provide the best diet possible within their resources.

**PB-286 675/4**

PC A02

Clemson Univ., S.C.  
**Engineering Considerations in the Aquaculture of 'Macrobrachium rosenbergii' in South Carolina**  
Paul Zielinski, Walter E. Castro, and Paul A. Sandifer. 1978, 6p NOAA-78082304

Descriptors: \*Shellfish, \*Fresh water fishes, \*Crustacea, \*Aquaculture, Shrimps, Larvae, Selection, Ponds, Aeration, Performance, Cylindrical bodies, Prototypes, Tanks(Containers), Pumping.  
Identifiers: \*Macrobrachium rosenbergii, Sea Grant program, Reprints.

A summary is presented of the progress to date on engineering experimentation involved with the culture of the fresh water prawn, *Macrobrachium rosenbergii*. The use of large rectangular tanks for treated culture water is possible, using silk mesh screens to separate larvae from the sump zone where the culture water is removed for treatment and returned to the animal portion of the tank. Large cylindrical tanks can be used in a recirculating flow system for larval culture and small cylindrical tanks are currently in use at MRRRI. A large tank and system as described here has not been tested with larvae. Similarity laws can be used to predict performance of prototype tanks from the results of model tests. Several desirable and preferred features of the ponds in use in South Carolina for the culture of *Macrobrachium* shrimp have been identified after three seasons of experience. The operation of an air lift pump at a point of optimal hydraulic performance will also provide maximum aeration efficiency in low lift pumping.

**PB-286 700/0**

PC A02/MF A01

California Univ., Davis. Water Resources Center.  
**Watercress-Crayfish Polyculture as an Economic Means of Stripping Nutrients from Enriched Waters. Proceedings of the International Symposium Freshwater Crayfish (3rd), Held at Kuopio, Finland on December 1976**  
J. Rundquist, G. Gall, and C. R. Goldman. 1976, 15p UCAL-WRC-W-475, OWRT-A-056-CAL(2)

Descriptors: \*Aquaculture, \*Waste water reuse, \*Crayfishes, \*Fisheries, Aquatic plants, Circulation, Inorganic nitrates, Ammonia, Phosphorus, Stripping(Distillation), Proteins, Feeding stuffs, Diets, Growth, Mortality, Economic factors, California.  
Identifiers: Recycling.

An experimental watercress-crayfish polyculture system is described. The watercress bed receives nutrient-rich effluent from a connecting trout hatchery and effectively strips nitrates, ammonia, and phosphorus from the waters. The harvested watercress also provides a clean and easy food source for crayfish. Preliminary feeding trials indicate that the watercress combined with protein supplement provides a satisfactory crayfish diet in terms of both growth and mortality. The development of watercress-crayfish polyculture is economically promising because of three valuable outputs—cleaner water, watercress, and crayfish.

**PB-286 702/6**

PC A02/MF A01

California Univ., Davis. Water Resources Center.  
**The Culture of Crayfish for Waste Recycling and Human Consumption**  
Completion rept.  
Graham A. E. Gall, and Charles R. Goldman. Jun 78, 15p UCAL-WRC-W-475, OWRT-A-056-CAL(5)

Descriptors: \*Trout, \*Aquaculture, \*Waste water reuse, \*Crayfishes, \*Fisheries, Circulation, Nutrients, Growth, Dissolved organic matter, Larval, Life cycles, Growth, Temperature, Reproduction(Biology), Nitrogen, Mortality, Diets, Aquatic plants, Phosphorus, California.  
Identifiers: \*Recycling.

An experimental watercress-crayfish culture system was developed which received a nutrient-rich effluent from a trout hatchery. The watercress system effectively stripped nutrients from effluent water and provided acceptable growth of watercress. The watercress removed 98% of the nitrate-nitrogen and 92% of the total phosphorus reducing the level of these two nutrients to near the level observed in the hatchery inflow supply. However, there was a significant increase of particulate organic matter in the effluent from the watercress growing-beds. Feeding trials indicated that watercress combined with a protein supplement provides a satisfactory diet for crayfish in terms of both growth rate and mortality. A detailed analysis of the growth of young crayfish from hatching through the fifth molt demonstrated that early growth involves two phases. The optimal temperature for growth appeared to be in the range of 17-22°C. A successful system of stripping eggs from the female and hatching them in a drip-type egg incubator was developed which yielded a 90% hatch and normal metamorphosis.

**PB-286 722/4**

PC A14/MF A01

Oregon State Univ., Corvallis. Agricultural Experiment Station.

**Management of Swine Manure for the Recovery of Protein and Biogas**

Final rept.

L. Boersma, E. Gasper, J. Miner, J. Oldfield, and H. Phinney. May 78, 309p OAES-SR-507, OWRT-78/12108

Sponsored in part by National Science Foundation, Washington, DC. Applied Science and Research Applications.

Descriptors: \*Agricultural wastes, \*Swine, \*Materials recovery, \*Proteins, \*Methane, Management planning, Synthetic fuels, Reclamation, Biodeterioration, Algae, Bacteria, Nutrients, Solid waste disposal, Feeding stuffs, Biomass, Anaerobic processes, Tables(Data).  
Identifiers: Manure, Waste heat utilization, *Chlorella vulgaris*.

Major findings of an investigation into the concept of nutrient and energy recovery from a swine waste management system are reported. Algae and bacteria were used to convert swine manure into methane-rich fuel gas and supplemental protein for animal feed. Waste heat from electricity generating plants was simulated to test its value in enhancing the biological recovery of nutrients and energy. The experimental facility was built adjacent to the Swine Research Center at Oregon State University and consisted of animal quarters with solid concrete floor and gutter to house 50 pigs, an anaerobic digester with a volume of 14 cu m, and 12 outdoor algae basins with a combined surface area of 24 sq m and a combined volume of 6,000 l. Manure was removed from the animal quarters by a gutter flushing system. The solids were separated from the liquids by gravity settling and then pumped into the digester for solubilization and recovery of biogas. The liquid phase of the diluted manure was pumped into the outdoor basins to serve as nutrient substrate for the growth of the high temperature strain 211/8K of *Chlorella vulgaris* as the predominant algal species. The algal biomass was concentrated by centrifugation and freeze dried. Its nutritional value as a protein source was determined by feeding trials with Long-Evans rats.



**PB-286 782/8** **PC A02/MF A01**  
California Univ., Davis. Div. of Environmental Studies.  
**Ecological Studies of the California Crayfish, 'Pacifastacus leniusculus', with Emphasis on Their Growth from Recycling Waste Products**  
Charles R. Goldman, Jane C. Rundquist, and R. Warren Flint. 1974, 11p OWRT-A-056-CAL(3)

Descriptors: \*Animal ecology, \*Crayfishes, \*Lake Tahoe, \*Sacramento River, \*Waste water reuse, Aquaculture, Coasts, Streams, Lakes, Eggs, Reproduction(Biology), Recycling.  
Identifiers: \*Pacifastacus leniusculus, \*Habitats.

This research has two main objectives. The first is an investigation of the ecological role of *Pacifastacus leniusculus* in its natural habitat such as Lake Tahoe, the Sacramento River, and the coast range streams and lakes. The second objective involves cooperative research around the world as regards intensive crayfish culture. This paper reviews previous work and presents outlook for the two objectives.

**PB-286 892/5** **PC A02/MF A01**  
Michigan State Univ., East Lansing. Dept. of Horticulture.  
**Trickle Irrigation in Michigan Fruit Plantings**  
Completion rept. 1 Jul 72-30 Sep 77  
A. L. Kenworthy. Jun 78, 16p OWRT-B-029-MICH(1)  
Contract DI-14-31-0001-3899

Descriptors: \*Water consumption, \*Fruit crops, \*Irrigation, Apple trees, Peach trees, Berry plants, Field tests, Nitrogen, Fertilizers, Trees(Plants), Size determination, Yield, Volume, Michigan.  
Identifiers: \*Trickle irrigation, Cherry trees, Plum trees, Traverse County(Michigan), Leelanau County(Michigan), Ottawa County(Michigan).

Research plots were established on apple, peach, plum, and sour cherry plantings in Grant Traverse County; on sour cherry, sweet cherry and plum in Leelanau County; and on blueberry in Ottawa County. Water application rates were 0, 0.5, 1.0, and 2.0 gallons of water per hour per tree in 1973 and 1974. In 1975 and 1976 the rate was 0, 1.0, 2.0 and 4.0 gph per tree. Duration of irrigation varied with tree size. In 1975, all plots (except blueberry) were subdivided for different rates of nitrogen application through the trickle system. Yield responses indicated that a rate of 2.0 gph was best for all apple cultivars except R. I. Greening, which showed the best response at 4.0 gph. Increase in yield with increased amounts of water was not significant for sour cherry, significant for peach, while plum, sweet cherry and blueberry showed no increase. Nitrogen application test results indicated that the amount of nitrogen could be reduced 50% if applied through the trickle system in June.

**PB-286 938/6** **PC A08/MF A01**  
Louisiana State Univ., Baton Rouge. Agricultural Experiment Station.  
**Water Quality Renovation of Animal Waste Lagoons Utilizing Aquatic Plants**  
Final rept. Jul 75-Dec 77  
Dudley D. Culley, Jr., James H. Gholson, Tom S. Chisholm, Leon C. Standifer, and Ernest A. Epps. Jul 78, 167p EPA/600/2-78/153  
Grant EPA-R-803326

Descriptors: \*Aquatic plants, \*Lagoons(Ponds), \*Agricultural wastes, \*Water pollution control, Aquaculture, Dairy cattle, Weed control, Yield, Plant growth, Nutrients, Concentration(Composition), Recovery, Ammonium compounds, Proteins, Nitrogen, Phosphorus, Potassium, Standards.  
Identifiers: *Spirodela oligoriza*, *Spirodela polyrrhiza*, *Lemna gibba*.

Duckweeds *Spirodela oligorhiza*, *S. polyrrhiza*, and *Lemna gibba* (clone G3) grown on dairy waste lagoons gave an estimated maximum annual yield of 22,023 kg dry wt./ha. *S. oligorhiza* and *L. gibba* had higher growth rates in the spring, fall, and winter, with *L. gibba* growing throughout most of the winter. Nutrient content of the plants increased with increasing nutrients in the lagoons. Mean crude protein of dry duckweeds was 36%, to a maximum of 42%. The duckweeds recovered on a

hectare basis the N, P, and K of 15.5, 34, and 8.8 lactating cows respectively. During the winter the rate was 1.27 mg/l/day (duckweed lagoons) and 0.82 mg/l/day for controls. Ammonium reduction was 84% greater in the duckweed lagoons during winter. Phosphorus reduction in duckweed lagoons, though significantly different from controls, was insufficient to meet water quality standards.

**PB-286 940/2** **PC A05/MF A01**  
Environmental Systems, Inc., Annapolis, MD.  
**Use of Solar Energy to Heat Anaerobic Digesters. Part I. Technical and Economic Feasibility Study. Part II. Economic Feasibility throughout the United States**  
Feasibility study 5 Nov 75-1 Jun 76  
Jess W. Malcolm, and David E. Cassel. Jul 78, 99p EPA/600/2-78/114  
Contract EPA-68-03-2356

Descriptors: \*Sewage sludge, \*Anaerobic processes, \*Solar heating, \*Digesters, \*Sludge digestion, Sewage treatment, Solar collectors, Flat plate collectors, Storage tanks, Heat exchangers, Computer programs, Economic analysis, Geography, Design, Feasibility, Computerized simulation, Energy conservation, Sludge disposal, Solid waste disposal.

Two distinct, yet related studies were conducted to determine the technical and economic feasibility of using solar energy as the source of heat for the anaerobic digestion process. Retrofitting a solar energy collection and heat transfer system to a digester at Annapolis, Maryland was proven feasible in the first part of the study and the concept of using solar energy for digester heating throughout the United States, including Fairbanks, Alaska, was shown to be economically feasible in the second part of the study. The Part I study compared five (5) types of flat plate collectors and selected the cost effective design to supply approximately 90 percent of the heat load to maintain digester operating temperatures of 32C to 38C. Three flat plate collectors of varying efficiencies were evaluated for use at numerous locations in the United States. The study showed that optimum-sized flat plate collectors can provide from 82 to 97 percent of the total annual digester heat, the higher percentages being applicable to areas of higher solar radiation. The Part II study developed specific guidelines for determining the optimum size and conceptual design for a solar heating system for any size sludge digester at any location.

**PB-287 060/8** **PC A11/MF A01**  
Corporacion de Fomento de la Produccion (Chile).  
**Envases para Alimentos Industrializados Chilenos. Tomo I (Packaging for Chilean Commercial Foodstuffs. Volume I)**  
Jun 77, 244p  
Prepared in cooperation with Javier Zaldivar Ingenieros Asociados Limitada (Chile), Development Planning and Research Associates, Inc., Manhattan, KS., and Ingenieros y Economistas Consultores (Chile). Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Food packaging, \*Chile, Industrial plants, Canning, Bottles, Beverages, Marketing, Exports, Milk, Fruits, Seafood, Rice, Coffee, Sugar crops, Bread, Wines, Sanitary engineering, Design, Quality, Food industry.  
Identifiers: Developing country application.

Results are presented on the status of foodstuff packaging in Chile; marketing projections are tabulated. The study, limited to 33 categories of foodstuffs selected by the three sponsoring agencies, gives recommendations on various aspects of foodstuff packaging for domestic consumption and for export. Research methodology includes questionnaires and summaries of plant visits to canneries, bottlers, supermarkets, retailers, and exporters. Attention is focused upon milk products, fruits, soups, seafood, margarine and fats, rice, coffee, sugar, crackers, chocolates, carbonated beverages, beer, wine, and bread. Metal packaging in many cases is associated with lost labels, denting, difficulty in opening, and inadequate sanitary protection. It was concluded that Chilean packaging compares well with that of other South American countries, but is less varied in form, size, and mate-

rials than European and North American countries. Labels do compare well, and in the future they will be more colorful and attractive. Plastic bottles should be more carefully designed in regard to capping to prevent infiltration of foreign matter and spillage. The Chilean government regulates materials, design, size, and sanitary provisions; it utilizes data from the U.S. Food and Drug Administration, as well as from its own experts. Future programs will cover increased automation methods and reduced costs resulting from improved physical distribution methods. (Portions of this document are not fully legible)

**PB-287 061/6** **PC A10/MF A01**  
Corporacion de Fomento de la Produccion (Chile).  
**Envases para Alimentos Industrializados Chilenos. Tomo II (Packaging for Chilean Commercial Foodstuffs. Volume II)**  
Jun 77, 202p  
Prepared in cooperation with Javier Zaldivar Ingenieros Asociados Limitada (Chile), Development Planning and Research Associates, Inc., Manhattan, KS., and Ingenieros y Economistas Consultores (Chile). Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Food packaging, \*Chile, Quality control, Distribution systems, Marketing, Prices, Supply(Economics), Packaging, Containers, Exports, Regulations, Food industry.  
Identifiers: Developing country application.

Foodstuff packaging in Chile is discussed in terms of quality control, physical distribution, marketing, pricing, supply and demand, and modern technology. Chapter XVI provides plans for creating an institute of packaging and packing; it details budget, staffing, organization, and activities. Topics highlighted are economics of physical distribution of foodstuffs, critical analysis of packaging in exporting, comparative price analysis between Chile and other countries, existing international regulations, price analysis and its impact on selling price, relationship between packaging cost and selling price compared with the United States. Conclusions and recommendations are presented on this study and 10 months of subsequent field work. Attention should be directed toward improvements in packaging as a protection for foodstuffs, physical distribution, and marketing. It is stressed that the cost of packaging bears a significant relationship with selling price of foodstuffs. It is estimated that costs of physical distribution account for 6-12% of the selling price. In Chile, the per capita consumption of canned or bottled beverages and foodstuffs is US \$8 per year, compared with US \$46 in the United States. This indicates possible future growth and expanded economic activity for Chile in the food industry. (Portions of this document are not fully legible)

**PB-287 062/4** **PC A07/MF A01**  
Corporacion de Fomento de la Produccion (Chile).  
**Envases para Alimentos Industrializados Chilenos. Anexos (Packaging for Chilean Commercial Foodstuffs. Volume III. Appendices)**  
Jun 77, 149p  
Prepared in cooperation with Javier Zaldivar Ingenieros Asociados Limitada (Chile), Development Planning and Research Associates, Inc., Manhattan, KS., and Ingenieros y Economistas Consultores (Chile). Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Food packaging, \*Chile, Marketing, Exports, Containers, Food industry, Packaging materials, Sanitary engineering, Design, Quality.  
Identifiers: Developing country application.

The following topics are discussed: a marketing plan for foodstuffs destined for internal consumption or for export; description of surveys undertaken; packaging in metal, glass, plastic or paper containers and the use of each in the food industry; visits to plants manufacturing the different types of packaging and packing materials. Appendix VIII consists of a directory of 36 regional and national institutes of packaging and packing. Some of these are in London, Tokyo, Hong Kong, Taiwan, Bombay, Seoul, Bangkok, Brussels, Copenhagen, Helsinki, Paris, Berlin, Budapest, Dublin, The Hague, Oslo, Warsaw, and New York. Appendix IX lists books, journals, periodicals, and abstract bul-



letins concerned with food containers. These are English language references, printed in either the United States or in England. Visits to manufacturers included, among others, the American Can Company, Container Corporation of America, Gulf and Western Manufacturing Company, Anchor Hocking, and the Forest Products Laboratory. Research methodology describes the questionnaire design, analytical methods and the evaluation of international trends in the food industry. Factors evaluated are dents in metal containers; presence of foreign substances in cans, bottles, or containers; chemical composition of glass bottles; processing of milk products; consumer acceptance and complaints; as well as deterioration in flavor, taste, or color. (Portions of this document are not fully legible)

**PB-287 063/2** PC A02/MF A01  
Department of Agriculture, Washington, DC.  
**Productos Biologicos Veterinarios, Ayudan a Combatir Las Enfermedades (Veterinary Biologics - Help Fight Animal Diseases)**  
Program aid rept.  
1971, 12p Rept no. USDA/PA-815  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Drugs, \*Immunization, \*Livestock, \*Animal diseases, Cattle, Poultry, Dogs, Cats, Rabbits, Swine, Vaccines, Toxins and antitoxins, Cholera, Tuberculosis, Rabies, Hepatitis.  
Identifiers: Developing country application, Immune serums, Erysipelas, Black murrain.

A study was undertaken of diseases (hog cholera, tuberculosis in cattle, rabies, black murrain, hepatitis and erysipelas) prevalent in farm animals (cattle, poultry, dogs, cats, rabbits, chinchillas, mink, pigs) and the use of vaccines, antiserums and antitoxins for control. Immunizations using both viral and bacterial vaccines; antitoxins to neutralize poisonous substances in the body; and antiserums to help defend against illnesses are all discussed with the emphasis on seeking knowledgeable help for administration of these drugs.

**PB-287 064/0** PC A06/MF A01  
Cordian Associates, Inc., New York.  
**La Industria Cementera (Industrial International Data Base the Cement Industry)**  
Sep 76, 123p NATO/CCMS-46  
Sponsored in part by Agency for International Development, Washington, DC., and Energy Research and Development Administration, Washington, DC. Office of Conservation.

Descriptors: International relations, Industries, Foreign countries, United States.  
Identifiers: \*Cement industry, \*Energy conservation, Energy efficiency, Developing country application.

This report addresses the need for a greater degree of international cooperation with respect to energy end-use conservation in particular industries. The purpose of this report is to cover the cement industry and to provide the details and the results of energy and technology comparisons for the various nations who participated in the study. Areas for possible improvement in energy efficiency are discussed, and a comparison is made of the energy content of various construction materials.

**PB-287 232/3** PC A03/MF A01  
Agency for International Development, Washington, DC. Community Development Div.  
**Developpement Communautaire L'Agent Rural et L'Organisation Democratique du Programme (Community Development, Volume 7. The Village-AID Worker and Democratic Program Planning)**  
J. D. Mezirow. Jun 62, 48p

Descriptors: \*Community development, \*Planning, Developing countries, Instructional materials, Guidelines, Community relations, Communities, Rural areas, Project planning, Project management.  
Identifiers: \*Villages, Developing country application.

In this pamphlet are ideas that have been found helpful in democratic program planning in village and rural areas. Practical approaches to democratic program planning are shown which have come from many programs in many places.

**PB-287 234/9** PC A03/MF A01  
Agency for International Development, Washington, DC. Community Development Div.  
**Community Development, Volume 7. The Village-AID Worker and Democratic Program Planning**  
J. D. Mezirow. Jun 62, 35p

Descriptors: \*Community development, \*Planning, Developing countries, Instructional materials, Guidelines, Community relations, Communities, Rural areas, Project planning, Project management.  
Identifiers: \*Villages, Developing country application.

In this pamphlet are ideas that have been found helpful in democratic program planning in villages and rural areas. Practical approaches to democratic program planning are shown which have come from many programs in many places.

**PB-287 235/6** PC A03/MF A01  
Agency for International Development, Washington, DC. Community Development Div.  
**Community Development: Conference on Conference Planning, Series A, Volume 6**  
J. D. Mezirow. May 62, 33p

Descriptors: \*Meetings, \*Planning, Community development, Management training, Leadership, Communicating, Evaluation, Group dynamics, Methodology, Reporting.  
Identifiers: Training techniques, Participant involvement, Developing country application, Follow up.

The report is compiled in the form of a manual including detailed methods of conference planning and procedures. It is concerned with the methods of: using conference planning as a training-ground for conference leadership, planning follow-up programs for such a conference, and making your own tool kit from printed materials available to conference planners and participants.

**PB-287 236/4** PC A03/MF A01  
Agency for International Development, Washington, DC. Community Development Div.  
**Conferencia Sobre el Planeamiento de las Conferencias (Community Development: Conference on Conference Planning, Series A, Volume 6)**  
J. D. Mezirow. May 62, 40p

Descriptors: \*Meetings, \*Planning, Community development, Management training, Leadership, Communicating, Evaluation, Group dynamics, Methodology, Reporting.  
Identifiers: Training techniques, Participant involvement, Developing country application, Follow up.

The report is compiled in the form of a manual including detailed methods of conference planning and procedures. It is concerned with the methods of: using conference planning as a training-ground for conference leadership, planning follow-up programs for such a conference, and making your own tool kit from printed materials available to conference planners and participants.

**PB-287 237/2** PC A03/MF A01  
Agency for International Development, Washington, DC. Community Development Div.  
**Developpement Communautaire: Preparation Des Conferences (Community Development: Conference on Conference Planning, Series A, Volume 6)**  
J. D. Mezirow. May 62, 50p

Descriptors: \*Meetings, \*Planning, Community development, Management training, Leadership, Communicating, Evaluation, Group dynamics, Methodology, Reporting.

Identifiers: Training techniques, Participant involvement, Developing country application, Follow up.

The report is compiled in the form of a manual including detailed methods of conference planning and procedures. It is concerned with the methods of: using conference planning as a training-ground for conference leadership, planning follow-up programs for such a conference, and making your own tool kit from printed materials available to conference planners and participants.

**PB-287 238/0** PC A02/MF A01  
Agency for International Development, Washington, DC. Community Development Div.  
**Community Development, Volume 5. Community Development, Extension and the Village-AID Synthesis**  
J. D. Mezirow. May 62, 17p

Descriptors: \*Community development, Developing countries, Local government, Citizen participation, Instructional materials, Guidelines, Planning, Technical assistance, Management, Agriculture, India, Projects.  
Identifiers: Developing country application, Agricultural extension services, Self help, Villages.

The paper is primarily concerned with the process which the practitioner uses to make the concept of community development a reality. The process requires that the job of the community development worker be fundamentally educational: to help the people acquire the attitudes, skills, and ideas that will enable them to take democratic action based on self-directed citizen responsibility and initiative.

**PB-287 239/8** PC A03/MF A01  
Agency for International Development, Washington, DC. Community Development Div.  
**Developpement Communautaire, Un Renfort pour la Vulgarisation Agricole (Community Development, Volume 5. Community Development, Extension and the Village-AID Synthesis)**  
J. D. Mezirow. May 62, 27p

Descriptors: \*Community development, Developing countries, Local government, Citizen participation, Instructional materials, Guidelines, Planning, Technical assistance, Management, Agriculture, India.  
Identifiers: Developing country application, Agricultural extension services, Self help, Villages.

The paper is primarily concerned with the process which the practitioner uses to make the concept of community development a reality. The process requires that the job of the community development worker be fundamentally educational: to help the people acquire the attitudes, skills, and ideas that will enable them to take democratic action based on self-directed citizen responsibility and initiative.

**PB-287 240/6** PC A02/MF A01  
Agency for International Development, Washington, DC. Community Development Div.  
**Desarrollo de la Comunidad Extension y Sintesis del Dai-C (Community Development, Volume 5. Community Development, Extension and the Village-AID Synthesis)**  
J. D. Mezirow. May 62, 21p

Descriptors: \*Community development, Developing countries, Local government, Citizen participation, Instructional materials, Guidelines, Planning, Technical assistance, Management, Agriculture, India.  
Identifiers: Developing country application, Agricultural extension services, Self help, Villages.

The paper is primarily concerned with the process which the practitioner uses to make the concept of community development a reality. The process requires that the job of the community development worker be fundamentally educational: to help the people acquire the attitudes, skills, and ideas that will enable them to take democratic action based on self-directed citizen responsibility and initiative.



**PB-287 241/4** PC A02/MF A01  
Agency for International Development, Washington, DC. Community Development Div.  
**Community Development, Volume 4. Community Development and Social Change**  
J. D. Mezirow. May 62, 20p

Descriptors: \*Community development, \*Social change, \*Citizen participation, Resources, Management, Education, Leadership, Organization theory, Culture(Social sciences), Socioeconomic status, Health, Fishing, Agriculture, Political systems, Minority groups.

Identifiers: Community action programs, Community change, Cultural background, Political socialization, Economic progress.

Change is considered as a series of actions which make a thing progressively better. The pamphlet discusses social change as a basic element of improvement and growth in community development of the barrio. Those areas of living to which change should be directed are enumerated. In addition, some techniques to facilitate change are explained including methods for organizing and managing resources needed for self help activities.

**PB-287 242/2** PC A03/MF A01  
Agency for International Development, Washington, DC. Community Development Div.  
**Desarrollo de la Comunidad y Cambio Social (Community Development, Volume 4. Community Development and Social Change)**  
J. D. Mezirow. May 62, 26p

Descriptors: \*Community development, \*Social change, \*Citizen participation, Resources, Management, Education, Leadership, Organization theory, Culture(Social sciences), Socioeconomic status, Health, Fishing, Agriculture, Political systems, Minority groups.

Identifiers: Community action programs, Community change, Cultural background, Political socialization, Economic progress.

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**PB-287 243/0** PC A03/MF A01  
Agency for International Development, Washington, DC. Community Development Div.  
**Developpement Communautaire Effets Sur L'Evolution Sociale (Community Development, Volume 6. Community Development and Social Change)**  
J. D. Mezirow. May 62, 31p

Descriptors: \*Community development, \*Social change, \*Citizen participation, Resources, Management, Education, Leadership, Organization theory, Culture(Social sciences), Socioeconomic status, Health, Fishing, Agriculture, Political systems, Minority groups.

Identifiers: Community action programs, Community change, Cultural background, Political socialization, Economic progress.

Change is considered as a series of actions which make a thing progressively better. The pamphlet discusses social change as a basic element of improvement and growth in community development of the barrio. Those areas of living to which change should be directed are enumerated. In addition, some techniques to facilitate change are explained including methods for organizing and managing resources needed for self help activities.

**PB-287 244/8** PC A02/MF A01  
Agency for International Development, Washington, DC. Community Development Div.  
**Community Development, Volume 3. CD in Urban and Semi-Urban Areas**  
May 62, 22p

Descriptors: \*Community development, \*Urban development, \*Philippines, Communities, Rural

areas, Urbanization, Coordination, Industries, Urban areas, Instructional materials, Urban planning, Local government, Agriculture, Roads, Houses, Sanitation, Public works, Education, Urban sociology.

Identifiers: Developing country application, Industrialization, Self help.

The development of urban communities cannot be successful unless there is a coordinated program which has been planned and closely integrated with the rural sectors of the country. In this booklet, the principles and approaches of community development as has been applied in the rural areas are being explored and studied with the idea of modifying them so that they may be applicable to urban development work.

**PB-287 245/5** PC A03/MF A01  
Agency for International Development, Washington, DC. Community Development Div.  
**Developpement Communautaire, Application dans les Zones Urbaines et Semi-Urbaines. (Community Development, Volume 3. CD in Urban and Semi-Urban Areas)**  
May 62, 35p

Descriptors: \*Community development, \*Urban development, \*Philippines, Communities, Rural areas, Urbanization, Coordination, Industries, Urban areas, Instructional materials, Urban planning, Local government, Agriculture, Roads, Houses, Sanitation, Public works, Education, Urban sociology.

Identifiers: Developing country application, Industrialization, Self help.

The development of urban communities cannot be successful unless there is a coordinated program which has been planned and closely integrated with the rural sectors of the country. In this booklet, the principles and approaches of community development as has been applied in the rural areas are being explored and studied with the idea of modifying them so that they may be applicable to urban development work.

**PB-287 246/3** PC A03/MF A01  
Agency for International Development, Washington, DC. Community Development Div.  
**Desarrollo de la Comunidad, D. C. en Zonas Urbanas y Suburbanas. (Community Development, Volume 3. CD in Urban and Semi-Urban Areas)**  
May 62, 27p

Descriptors: \*Community development, \*Urban development, \*Philippines, Communities, Rural areas, Urbanization, Coordination, Industries, Urban areas, Instructional materials, Urban planning, Local government, Agriculture, Roads, Houses, Sanitation, Public works, Education, Urban sociology.

Identifiers: Developing country application, Industrialization, Self help.

The development of urban communities cannot be successful unless there is a coordinated program which has been planned and closely integrated with the rural sectors of the country. In this booklet, the principles and approaches of community development as has been applied in the rural areas are being explored and studied with the idea of modifying them so that they may be applicable to urban development work.

**PB-287 247/1** PC A02/MF A01  
Agency for International Development, Washington, DC. Community Development Div.  
**Community Development, Volume 2. Making Council Meetings More Successful**  
May 62, 14p

Descriptors: \*Community development, \*Planning, \*Meetings, Guidelines, Management, Organizing, Coordination, Questionnaires, Instructional materials, Proceedings, Local government, Municipalities.

Identifiers: Developing country application.

The brochure is primarily designed to serve as a helpful guide for anyone who is responsible for

planning and conducting effective meetings in any area of community planning and development.

**PB-287 248/9** PC A02/MF A01  
Agency for International Development, Washington, DC. Community Development Div.  
**Developpement Communautaire. Organisation des Conseils (Community Development, Volume 2. Making Council Meetings More Successful)**  
May 62, 21p

Descriptors: \*Community development, \*Planning, \*Meetings, Guidelines, Management, Organizing, Coordination, Questionnaires, Instructional materials, Proceedings, Local government, Municipalities.

Identifiers: Developing country application.

The brochure is primarily designed to serve as a helpful guide for anyone who is responsible for planning and conducting effective meetings in any area of community planning and development.

**PB-287 249/7** PC A02/MF A01  
Agency for International Development, Washington, DC. Community Development Div.  
**Como Hacer mas Eficaces las Asambleas de los Consejos (Community Development, Volume 2. Making Council Meetings More Successful)**  
May 62, 17p

Descriptors: \*Community development, \*Planning, \*Meetings, Guidelines, Management, Organizing, Coordination, Questionnaires, Instructional materials, Proceedings, Local government, Municipalities.

Identifiers: Developing country application.

The brochure is primarily designed to serve as a helpful guide for anyone who is responsible for planning and conducting effective meetings in any area of community planning and development.

**PB-287 250/5** PC A04/MF A01  
Agency for International Development, Washington, DC. Communications Resources Div.  
**Food for Peace Around the World**  
1963, 62p

Descriptors: \*Food dispensing, \*Food services, \*Communities, Food preparation, Health, Nutrition, Projects, Manuals, Planning, Services, Kitchen equipment and supplies, Food sanitation, Local government, Schools, Developing countries.

Identifiers: Food for Peace program, Developing country application, School lunch programs.

The publication suggests ways of setting up or improving simple and inexpensive feeding centers, ways of using local food, and ways of preparing and serving the food. The material will be helpful to all who are working to improve health and well-being through community feeding centers and school lunch programs.

**PB-287 251/3** PC A04/MF A01  
Agency for International Development, Washington, DC. Communications Resources Div.  
**Alimentos para la Paz en todo el Mundo (Food for Peace Around the World)**  
1963, 65p

Descriptors: \*Food dispensing, \*Food services, \*Communities, Food preparation, Health, Nutrition, Projects, Manuals, Planning, Services, Kitchen equipment and supplies, Food sanitation, Local government, Schools, Developing countries.

Identifiers: Food for Peace program, Developing country application, School lunch programs.

The publication suggests ways of setting up or improving simple and inexpensive feeding centers, ways of using local food, and ways of preparing and serving the food. The material will be helpful to all who are working to improve health and well-being through community feeding centers and school lunch programs.

**PB-287 252/1** PC A03/MF A01  
Singer Mfg. Co., Bridgeport, CT.



## **Make-a-Dress. Learn to Sew the Easy Way**

Suzanne H. Firman. 1978, 43p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Sewing, \*Instructional materials, \*Clothing, Pattern making, Apparel fabrics, Crafts.  
Identifiers: Developing country application.

Sewing is a practical and creative art that can become a profitable hobby. This manual shows you how to make a foundation pattern and how to use this pattern to make two types of dresses. Once you have completed these you will be able to create a number of styles from this foundation pattern.

**PB-287 253/9** PC A04/MF A01  
Singer Mfg. Co., Bridgeport, CT.  
**Comment Faire Une Robe. (Make-a-Dress. Learn to Sew the Easy Way)**  
Suzanne H. Firman. 1978, 54p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Sewing, \*Clothing, \*Instructional materials, Pattern making, Apparel fabrics, Crafts.  
Identifiers: Developing country application.

Sewing is a practical and creative art that can become a profitable hobby. This manual shows you how to make a foundation pattern and how to use this pattern to make two types of dresses. Once you have completed these you will be able to create a number of styles from this foundation pattern.

**PB-287 254/7** PC A03/MF A01  
Washington County Closed Circuit Television Project, Hagerstown, MD.  
**Creating Visuals for TV**  
James Spear. c1962, 49p

Descriptors: \*Television systems, \*Education, Visual aids, Training aids, Training films, Training devices, Instructions.  
Identifiers: Developing country application.

The guide should be useful for those who are concerned with discovering new ways of making their TV programming more exciting and challenging. It should be of particular help to those who are approaching the TV medium for the first time, either on commercial or educational channels, or on closed-circuit installations. Topics covered include studio props, special effects, projected resources, and nonprojected resources.

**PB-287 255/4** PC A05/MF A01  
Washington County Closed Circuit Television Project, Hagerstown, MD.  
**Les Auxiliaires Visuels dans la Television Scolaire (Creating Visuals for TV)**  
James Spear. 1962, 79p

Descriptors: \*Television systems, \*Education, Visual aids, Training aids, Training films, Training devices, Instructions.  
Identifiers: Developing country application.

This guide should be useful for those who are concerned with discovering new ways of making their TV programming more exciting and challenging. It should be of particular help to those who are approaching the TV medium for the first time, either on commercial or educational channels, or on closed-circuit installations. Topics covered include studio props, special effects, projected resources, and nonprojected resources.

**PB-287 256/2** PC A02/MF A01  
Agency for International Development, Tunis (Tunisia).  
**Some Aspects of an Open Drainage Canal and Maintenance Program**  
William J. Davis. 1978, 18

Descriptors: \*Maintenance, \*Drainage, \*Irrigation canals, Cost effectiveness, Tractors, Cleaning, Failure, Prevention, Vegetation, Weed control, Shovels, Photographs.  
Identifiers: Developing country application.

This booklet contains many aspects of a drainage program. Topics discussed include principal causes for the failure of open drainage canals, recent research on the mechanics of open drainage canal maintenance, and the Ahmed Davis shovel. Included in the booklet are several pages of photographs depicting various techniques.

**PB-287 257/0** PC A02/MF A01  
Agency for International Development, Tunis (Tunisia).  
**L'Entretien des Canaux de Drainage a Ciel Ouvert (Some Aspects of an Open Drainage Canal and Maintenance Program)**  
William J. Davis. 1978, 24p

Descriptors: \*Maintenance, \*Drainage, \*Irrigation canals, Cost effectiveness, Tractors, Cleaning, Failure, Prevention, Vegetation, Weed control, Shovels, Photographs.  
Identifiers: Developing country application.

This booklet contains many aspects of a drainage program. Topics discussed include principal causes for the failure of open drainage canals, recent research on the mechanics of open drainage canal maintenance, and the Ahmed Davis shovel. Included in the booklet are several pages of photographs depicting various techniques.

**PB-287 258/8** PC A06/MF A01  
Indiana Univ., Bloomington.  
**L'Importance de la Formation dans les Services Public (Improving the Public Service Through Training)**  
Lynton K. Caldwell. Nov 62, 118p

Descriptors: \*Specialized training, \*National government, \*Services, Resources, Learning, Education, Manpower utilization, Developing countries, Problem solving, Productivity, Students, Schools, Requirements, Government employees, Universities, Evaluation.

The purpose of this document is to interpret the function of training in present day government. It is addressed to a world-wide audience that includes public officials, political leaders, and civic-minded people everywhere who are concerned with improvement of the public service. It is intended to be useful to officials engaged in international technical assistance; to personnel, planning, and training officers; and to people interested in education for development administration. It does not describe training techniques but does set forth principles and concepts that are basic to enlargement of the human resources needed in national development.

**PB-287 259/6** PC A07/MF A01  
Indiana Univ., Bloomington.  
**Improving the Public Service Through Training**  
Lynton K. Caldwell. Nov 62, 134p

Descriptors: \*Specialized training, \*National government, \*Services, Resources, Learning, Education, Manpower utilization, Developing countries, Problem solving, Productivity, Students, Schools, Requirements, Government employees, Universities, Evaluation.

The purpose of this document is to interpret the function of training in present day government. It is addressed to a world-wide audience that includes public officials, political leaders, and civic-minded people everywhere who are concerned with improvement of the public service. It is intended to be useful to officials engaged in international technical assistance; to personnel, planning, and training officers; and to people interested in education for development administration. It does not describe training techniques but does set forth principles and concepts that are basic to enlargement of the human resources needed in national development.

**PB-287 260/4** PC A07/MF A01  
Bureau of Employment Security, Washington, DC.  
**Determination des Aptitudes et de la Formation Requises pour la Main-d'oeuvre (Techniques for Determining Manpower Skill Needs and Training Requirements)**  
Margaret Thal-Larsen. May 63, 130p

Descriptors: \*Manpower utilization, \*Personnel development, Personnel management, Requirements, Specialized training, Career development, Education.  
Identifiers: Developing country application.

This report is a handbook of simplified techniques for use in developing countries. The handbook includes methods for determining current skill needs and for introducing a continuing program of manpower reporting. The three areas discussed in this handbook are: manpower planning in economic planning; the area manpower skill survey; and occupational guides. Also included in the handbook is a section of worksheets to be used in the practical application of the techniques discussed.

**PB-287 261/2** PC A08/MF A01  
Bureau of Employment Security, Washington, DC.  
**Techniques for Determining Manpower Skill Needs and Training Requirements**  
Margaret Thal-Larsen. May 63, 154p

Descriptors: \*Manpower utilization, \*Personnel development, Personnel management, Requirements, Specialized training, Career development, Education.  
Identifiers: Developing country application.

This report is a handbook of simplified techniques for use in developing countries. The handbook includes methods for determining current skill needs and for introducing a continuing program of manpower reporting. The three areas discussed in this handbook are: manpower planning; the area manpower skill survey; and occupational guides. Also included in the handbook is a section of worksheets to be used in the practical application of the techniques discussed.

**PB-287 262/0** PC A12/MF A01  
Bureau of Employment Security, Washington, DC.  
**Demographic Techniques for Manpower Planning in Developing Countries**  
1968, 262p

Sponsored in part by Agency for International Development, Washington, DC. Office of Labor Affairs.

Descriptors: \*Manpower, \*Requirements, \*Planning, \*Developing countries, \*Populations, Demographic surveys, Methodology, Population growth, Statistical analysis, Economic development, Interpolation, Extrapolation, Census, Population migrations.  
Identifiers: \*Manpower development programs, Population dynamics, Labor force estimates, Age groups, Developing country application.

Important for the economic development process of any nation is an accurate assessment of its manpower. The handbook was prepared to meet the need for simplified techniques for estimating the labor forces and that part of the population which might be affected by manpower development programs. The areas discussed include: estimating and projecting total population, estimating and projecting components of population change, and the labor force. Included in the handbook is a section of worksheets for practical application of the areas discussed.

**PB-287 264/6** PC A08/MF A01  
Bureau of Employment Security, Washington, DC.  
**Tecnicas Demograficas Para El Planeamiento de la Mano de Obra de Paises en Desarrollo (Demographic Techniques for Manpower Planning in Developing Countries)**  
1968, 151p

Sponsored in part by Agency for International Development, Washington, DC. Office of Labor Affairs.

Descriptors: \*Manpower, \*Requirements, \*Planning, \*Developing countries, \*Populations, Demographic surveys, Methodology, Population growth, Statistical analysis, Economic development, Interpolation, Extrapolation, Census, Population migrations.  
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**PB-287 349/5** **PC A12/MF A01**  
Stanford Univ., CA. Inst. for Mathematical Studies in the Social Sciences.

**The Radio Mathematics Project: Nicaragua 1974-1975**

Barbara Searle, Jamesine Friend, and Patrick Suppes. c1976, 274p

Sponsored in part by Nicaraguan Ministry of Public Education, Managua, and Agency for International Development, Washington, DC. Bureau for Technical Assistance.

Descriptors: \*Instructional materials, \*Mathematics, Radio broadcasting, Students, Learning, Nicaragua.  
Identifiers: Curricula, Developing country application.

This volume reports on the first experimental year of a research project designed to investigate, in a detailed and systematic way, the use of radio to teach mathematics in the primary-school classrooms of a developing country. Extensive collection of student response data, along with an explicit model for curriculum development, makes possible the type of study previously absent from the research literature. In July 1973 the United States Agency for International Development (AID) contracted with the Institute for Mathematical Studies in the Social Sciences (IMSSS) at Stanford University to carry out a two-stage project. During the first stage, which occupied the first funding year, members of the Institute staff visited several developing countries, whose governments had expressed an interest in teaching by radio, and selected from among them a suitable project site. The second stage of the project, undertaken in conjunction with the Ministry of Education of Nicaragua, is devoted to the development and evaluation of the radio instructional system. At present, the Radio Mathematics Project operates with financial support from both AID and the Government of Nicaragua.

**PB-287 818/9** **PC A07/MF A01**  
Association of Geoscientists for International Development, St. John's (Newfoundland).  
**International Workshop on Earth Science Aid to Developing Countries Held at Memorial University, St. John's, Newfoundland, Canada on May 17-19, 1974. Background Documents**  
A. R. Berger. Oct 74, 150p

Descriptors: \*Developing countries, \*Meetings, Employment, Earth sciences, Minerals, Ground water, Education, Industries, Resources, Specialized training, Professional personnel, Proposals, Foreign aid, International relations.  
Identifiers: Program effectiveness, Developing country application.

On August 22 and 23, 1972, a meeting entitled 'Earth Science Aid to Developing Countries' was held in Montreal, Canada, as Symposium 2 of the 24th International Geological Congress. The participants in this symposium represented a broad cross-section from both donor and recipient countries, and discussed a wide range of topics relating to aid programs in general. At the final session of the Symposium a proposal was made to establish an international committee with the objective of providing further opportunities for the exchange of ideas and opinions on earth science aid. (Portions of this document are not fully legible)

**PB-287 877-T** **PC A08/MF A01**  
Office of Education, Washington, DC.

**Selected Bibliography of Educational Materials: Maghreb, Algeria, Libya, Morocco, and Tunisia. Volume 10, Number 3, 1976**  
1976, 167p Rept no. TT-76-55094/3

The above journal is translated on a regular basis. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

Descriptors: \*Education, \*North Africa, \*Bibliographies, Algeria, Libya, Morocco, Tunisia, Philosophy, Organizations, Instructional materials, Classifications, Specialized training, Programmed instruction, Systems management, Translations.  
Identifiers: \*Maghreb countries.

Combating illiteracy, preparing an often isolated youth with little broad cultural background to participate in modern society, and developing a multilingual approach are major factors in the educational philosophy in the Maghreb. A main difficulty in compiling a bibliography in this field is that most materials come from newspapers or government publications. As far as possible other information is included.

**PB-287 878-T** **PC A03/MF A01**  
Office of Education, Washington, DC.  
**Selected Bibliography of Educational Materials: Maghreb, Algeria, Libya, Morocco, and Tunisia. Volume 10, Number 4, 1976**  
1976, 37p Rept no. TT-76-55094/4

The above journal is translated on a regular basis. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

Descriptors: \*Education, \*North Africa, \*Bibliographies, Algeria, Libya, Morocco, Tunisia, Philosophy, Organizations, Instructional materials, Classifications, Specialized training, Programmed instruction, Systems management, Translations.  
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**PB-287 940/1** **PC A06/MF A01**  
Puerto Rico Univ., Mayaguez. Dept. of Marine Sciences.  
**Enhancement of Warmwater Fishcultures in Puerto Rico Through Use of Polyculture Systems Hybridization and of Local Foodstuffs in Formulation and Manufacture of Fish Feed Diets**  
Final rept. Jul 76-Jun 77  
Ricardo C. Cortes Maldonado, and F. A. Pagan-Font. Sep 78, 115p NOAA-78092707

Descriptors: \*Aquaculture, \*Catfishes, \*Puerto Rico, Fresh water fishes, Manuals, Ponds, Sites, Waste water reuse, Density(Mass/volume), Tropical regions, Economic analysis, Production, Diets, Feeding stuffs.  
Identifiers: \*Ictalurus punctatus.

The objective of this study was to test farm pond polyculture techniques using channel catfish (*Ictalurus punctatus*) and various combination of tilapia (*Sarotherodon* sp.) hybrids. Channel catfish cultured in combinations with various tilapia species and hybrids was more economically desirable than the monoculture of catfish. A manual to provide information to those interested in aquaculture was developed for distribution to the aquaculture industry.

**PB-288 209/0** **PC A03/MF A01**  
Economic Research Service, Washington, DC. Economic Development Div.  
**Strategies for Balanced Growth in Developing Countries**  
Final rept.  
Clark Edwards. Jul 77, 35p Rept no. AER-375

Descriptors: \*Economic development, \*Developing countries, \*Growth, \*Agricultural economics, Strategy, Technical assistance, Rural areas, Urban areas, Marketing, Farm crops, Productivity, Capital, Links(Mathematics), Government policies.  
Identifiers: \*Economic growth, \*Economy, Technological advancement, Capital investments, Economic sectors, Program implementation.

Strategies for balancing growth among several economic sectors of a developing nation are outlined. The report focuses on programs to increase food production in the developing world and covers four separate sectors of a developing economy: traditional agriculture, advancing agriculture, the rural nonfarm economy, and the urban economy. The report notes that when new technology is introduced to any one sector, planners often overlook unintended side effects, some favorable and some not, on the other three sectors. Multifaceted programs designed to increase technology in rural and urban industries as well as in agriculture may help to alleviate some of the side effects.

**PB-288 274/4** **PC A12/MF A01**  
American Society of Civil Engineers, New York.  
**Appropriate Technology in Water Supply and Waste Disposal; a Workshop at the Annual Convention American Society of Civil Engineers Held at Chicago, Illinois on October 16-20, 1978**  
Oct 78, 260p Rept no. PREPRINT-3453

Descriptors: \*Water supply, \*Sewage disposal, Water consumption, Municipalities, Water reclamation, Design criteria, Water distribution, Cost effectiveness, Lagoons(Ponds), Toilet facilities, History, Irrigation, Waste water, Systems analysis, Europe, Pumping, Epidemiology, Sanitation.  
Identifiers: Developing country application, Land application, Ocean waste disposal, Appropriate technology.

Contents:  
Historical thresholds in water supply and waste disposal;  
Behavioral factors in selection of technologies;  
Tradition and innovation in water use and reclamation;  
Simplified water treatment plant design;  
Intermediate service levels in water distribution;  
Intermediate service levels in sanitation systems;  
Environmental epidemiology and sanitation;  
Cost-effective use of municipal wastewater treatment ponds;  
Land treatment systems and the environment;  
Systems of waste water management in Europe;  
Measuring the effects of man's wastes on the ocean.

**PB-288 384/1** **PC A02/MF A01**  
Michigan State Univ., East Lansing.  
**Design and Management of Rural Ecosystems**  
Final rept. Jul 75-Jul 76.  
1976, 15p NSF/RA-761630  
Grant NSF-GI-20, NSF-ARA70-01077

Descriptors: \*Land use, \*Rural areas, \*Agricultural economics, Ecology, Natural resources, Social effect, Management, Design, Irrigation, Decision making, Systems analysis, Mathematical models, Policies, Michigan.

The detailed results of the past two years of work on this project are presented in a series of 16 reports. This final report is a technical and detailed summary of the results given in reports 1 through 13, including a brief narrative discussion of the theoretical framework that provides a congruence to the particulars given in the reports. The principles of resource management suggest that decisions relating to comprehensive planning fall into three general categories: technical alternatives, ecological choices (natural environment), and institutional choices (social and cultural organization). Detailed studies of proto-typical subsystems relating to each class of decision were carried out as part of the overall effort. The results of these studies and their relationship to the overall conceptual framework are summarized in this report.



**PB-288 897/2** PC A16/MF A01  
Design Alternatives, Inc., Washington, DC.  
**Proceedings of Workshop on Appropriate Technology Held January 23-25, 1978**  
Final rept.  
Jan 78, 360p NSF/RA-780182  
Contract NSF-C-ERS77-21824

Descriptors: \*Technology assessment, \*Meetings, Technology innovation, Economic development, Energy, Waste disposal, Residential buildings, United States, Recommendations.  
Identifiers: \*Appropriate technology.

A workshop was convened to enable people with interests or experience in appropriate technology to examine and document locally-focused issues in this field, and to contribute recommendations for a research agenda and program guidelines which could be considered in planning a distinct research program in appropriate technology. Appropriate technology is defined here as a socio-technical process which encompasses technology design, assessment, and use. Issues to be examined were identified after review of concerns expressed by those who responded to a previous survey focused on local activities in appropriate technology, and after review of current or planned programs in different federal agencies. Six functional areas were chosen as subjects for examination: housing, local economic development, energy, waste disposal, health, and food. Participants documented local experience and concerns in the form of case studies and individually and collectively developed ideas through the workshops which were used to develop a research agenda and program guidelines. Using this information, the workshop convener identified 27 basic research questions, and 10 high priority questions for the agenda.

**PB-288 925/1** PC A09/MF A01  
ACTION/Peace Corps, Washington, DC.  
**Intensive Vegetable Gardening for Profit and Self-Sufficiency**  
Program and training journal reprint series  
Deborah Vickery, and James Vickery. Mar 78, 178p Rept no. REPRINT SER-25

Descriptors: \*Vegetable crops, \*Cultivation, \*Horticulture, Manuals, Income, Food supply, Plants(Botany), Soil fertility, Plant growth, Plant diseases, Irrigation, Pest control, Fertilizing, Tomato plants, Cabbage, Agricultural machinery, Planting, Mulches, Spraying.  
Identifiers: Developing country application.

This manual provides the knowledge to help grow more food on less land which will increase incomes and provide a more abundant supply of food for the farmer, his country, and the world. The book is illustrated and discusses the importance of soil management, water usage, and fertilizers. A bibliography of other books relating to increased vegetable production has also been included.

**PB-289 114/1** PC A04/MF A01  
United Engineering Trustees, Inc., New York.  
**Methanol As an Alternate Fuel. Volume I. Conference Report of 1974 Engineering Foundation Conference Held at New England College, Henniker, New Hampshire on July 7-12, 1974**  
Summary rept.  
Jul 74, 70p NSF/OEP-7423963/1/5  
Grant NSF-OEP74-23963

Descriptors: \*Methyl alcohol, \*Fuels, \*Meetings, Coal gasification, Crude oil, Natural gas, Cost analysis, Substitutes, Biomass, Fuel consumption, Utilization, National government.  
Identifiers: Solid wastes, \*Synthetic fuels, Manufactured gas.

Adequate technology exists to process gas, oil, and coal as feedstocks for methanol production; the technology to process solid wastes is still being developed. Methanol can be produced at prices competitive with current premium fuel price levels but, should foreign oil prices drop significantly, investment capital would be hard to attract. Priorities for developing conversion techniques should be (1) foreign flare gas; (2) municipal solid waste; (3) coal. Political and reliability considerations might rule out foreign sources. Uses of methanol fuel that become technically and eco-

nomically ready in 5-10 years could absorb all methanol that might be available at competitive prices. Public policy could motivate government action to develop new fuel applications, such as automotive fuels. The government should share the risk of developing a methanol fuels industry; a number of alternatives to guarantee a market for methanol might be considered.

**PB-289 115/8** PC A23/MF A01  
United Engineering Trustees, Inc., New York.  
**Methanol As an Alternate Fuel. Volume II. Reprints of Papers of 1974 Engineering Foundation Conference Held at New England College, Henniker, New Hampshire on July 7-12, 1974**  
Jul 74, 546p NSF/OEP-7423963/2/5  
Grant NSF-OEP74-23963

Descriptors: \*Methyl alcohol, \*Fuels, Environmental surveys, Technology, National government, Biomass, Coal gasification, Cost analysis, Air pollution, Petrochemistry, Fuel cells, Sources, In situ combustion, Manufacturing, Physical properties, Chemical properties, Natural gas, Electric power plants, Synthesis(Chemistry), Proteins, Utilization, Chemical industry, Motor vehicles, Blends, Gasoline, Feasibility, Comparison.  
Identifiers: Solid wastes, Refuse derived fuels, Manufactured gas, Synthetic fuels, Low btu gas, Air quality.

The following papers were presented at the conference and are reprinted in this report. They include Physico-chemical properties of methanol related to fuel use, Methanol fuel from natural gas, Methyl fuel from remote gas sources, Technological aspects of producing methanol from coal, Methanol as a gas turbine fuel, Utility fuel system - low btu gas and methanol, Methanol-gasoline blends - a fuel supplier's viewpoint, Methanol-gasoline blends - university viewpoint, Feasibility study of alternative automotive fuels, Comparison of methanol and methanol-blends, Production of methanol from coal for the automotive market, Methanol - chemical uses today, Protein from methanol, Industrial wastewater: source or sink for methanol, Methyl alcohol production by in situ coal gasification, Methanol from forestry, municipal, and agricultural organic residues, Methanol from solid waste ... its local and national significance, Methanol as a fuel in the urban energy economy and possible sources of supply, Potential long-range improvements in methanol production, Methanol fuel for fuel cells, Methanol fuel - long-range implications for petrochemicals, Coal-derived methanol as motor fuel, Environmental aspects of methanol as vehicular fuel: health and environmental effects, and Environmental aspects of methanol as vehicular fuel: air quality effects.

**PB-289 244/6** PC A03/MF A01  
Illinois Valley Economic Development Corp., Carlinville.  
**Solar Space Heaters for Low-Income Families**  
Roger Fenton, and Patti Donahue. Sep 78, 29p ILLDOE-78/09  
Sponsored in part by Illinois Inst. of Natural Resources, Springfield. Div. of Alternative Energy.

Descriptors: \*Solar heating, \*Space heaters, Manuals, Construction, Residential buildings, Windows, Design.  
Identifiers: \*Solar space heating, Low costs, Solar collectors.

The publication is a manual designed to guide individuals in the construction and installation of a low-cost window-box solar collector. Included are explanations of solar collector fundamentals, lists of construction and installation materials and tools, step-by-step procedures for building and installing a unit and an extensive bibliography of information on home weatherization and solar energy use. (Portions of this document are not fully legible)

**PB-289 251/1** PC A07/MF A01  
Arizona Univ., Tucson. School of Renewable Natural Resources.  
**Forward Osmosis Extractors: Theory, Feasibility and Design Optimization**  
Doctoral thesis  
Charles Donald Moody. 1977, 150p OWRT-B-053-ARIZ(4)

Contract DI-14-34-0001-7137

Descriptors: \*Desalting, \*Membranes, \*Extractors, Theses, Solvents, Mathematical models, Potable water, Fortran, Computer programs, Fertilizers, Cost analysis, Polarization(Charge separation), Water treatment, Irrigation water, Water reclamation, Design criteria, Permeability, Feasibility.  
Identifiers: \*Reverse osmosis desalination.

Osmosis occurs when two solutions of differing osmolar concentrations are separated by a membrane permeable to the solvent but not to the solutes. In osmosis, water flows spontaneously from the low concentration source solution to the high concentration driving solution. Forward osmosis is examined as a low-technology, low-energy use process for hydration and dehydration of aqueous solutions. The fundamental mechanical device is a continuous counterflow extractor which incorporates a semipermeable membrane separating the source and driving solutions. The counterflow design permits maximum water recovery from the source solution and maximum dilution of the driving solution. The nonlinear differential equations describing the water and solute flows in the extractor are solved using analytical and numerical techniques. The resulting mathematical models contain design equations which can be used to determine the optimum membrane transport characteristics, optimum membrane size, and the asymmetric membrane orientation which minimizes concentration polarization. Theoretical and experimental results compare well. Two applications discussed in detail are the production of potable water from seawater using human nutrients, and fertilizer-driven forward osmosis (FDFO) for converting saline water to irrigation water.

**PB-289 983/9** PC A05/MF A01  
Inter-American Development Bank, Washington, DC.  
**Aspectos de la Produccion Agropecuaria de Centro-America en el Marco de la Integracion Economica (Aspects of Central American Farming Production within the Framework of Economic Integration)**  
1977, 91p

Descriptors: \*Forestry, \*Agricultural economics, \*Developing countries, Production, Farm crops, Cattle, International trade, International relations, Grain crops, Food, Costa Rica, El Salvador, Guatemala, Shortages, Prices, Investments, Honduras, Nicaragua, Central America.  
Identifiers: Developing country application.

This publication is divided into three reports: (a) potential for specialization in the farming areas of Central American countries, (b) the farming sub-sector in Central America, and (c) regional cooperation for the development of Central American forest resources. Between 1974 and 1976, in cooperation with the respective governments, a tripartite study was made of the rural and farming sectors in Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. The purpose of this publication is to delineate certain problems common to two or more of the countries which may, to a certain extent, be resolved through mutual cooperation. Increased productivity in cattle and crop raising, and hence in income, depends upon the degree of specialization of the five countries. In each country there are significant differences in soil, erosion, temperature, and precipitation. To offset such differences, efforts are being made to redistribute rural populations to less exploited areas. Trade restrictions on grain crops have hindered optimum utilization of resources and a local shortage of some foodstuff leads to price fluctuations that are undesirable. It is stated that investment and development programs can be aimed toward projects apt to promote competition leading to better organization of total resources.

**PB-289 984/7** PC A05/MF A01  
Inter-American Development Bank, Washington, DC. Div. of General Studies.  
**Informe General Sobre el Desarrollo Agropecuario y Rural de El Salvador (General Report on Rural and Farming Development of El Salvador)**  
Dec 76, 78p



Descriptors: \*El Salvador, \*Agricultural economics, Production, Farm crops, Cattle, Exports, Project planning, Rural areas, Grain crops, Food consumption.  
Identifiers: Developing country application.

During August and September 1974, a tripartite study was made for the purpose of assisting the government of El Salvador to study the strategy, policies, programs, and projects for increasing production in cattle and crop raising activities, and for raising the standard of living in rural areas. This report summarizes the background and rationale which gave rise to the principal suggestions and comments. Eight technical annexes, published in two separate volumes, provide a more detailed discussion of certain aspects of this general report. This report and its annexes are part of a series on the five Central American countries. The following main topics are outlined: national economy in relation to the cattle and crop raising sector; trends in the production of grain and cattle; socioeconomic factors affecting development; organization of agencies concerned with agriculture; soil resources in relation to production; incentives for agricultural development; and, strategy for rural and farming development.

**PB-289 985/4** **PC A06/MF A01**  
Centre National de Documentation Agricole, Tunis (Tunisia).

**Index Retrospectif. Planification et Developpement Agricoles, Nos. 30001-30536, Volume 1 (Retrospective Index. Agricultural Planning and Development, Nos. 30001-30536, Volume 1)**  
1978, 117p

Descriptors: \*Agriculture, \*Planning, \*Development, \*Indexes(Documentation), Tunisia, Production, Cooperation, Bibliographies, Irrigation, Farm crops, Farm management.  
Identifiers: Developing country application.

As the first in a series of new publications, a retrospective index of bibliographic data is presented on agricultural planning and development. Rapid access to such information, by sectors, is needed by Tunisia in order to prevent useless duplication of research efforts. Documentation representing 40,000 reports, dating from 1947, was gathered by the National Center of Agricultural Documentation; it was then analyzed and microfiched. Information from these reports is disseminated through retrospective indexes. These data base of documents and microfiche can be accessed according to the need of users. For example, a user interested in ground water may formulate several questions which are then developed into a search strategy. The end product is a specialized bibliography corresponding to that query. Each bibliographic citation contains a brief analytical summary which is composed of descriptive key words. Some examples of key words are sociological survey, technical report, synthesis. The key words are arranged so as to form a type of annotation. The original language of the document is indicated. Documents selected by the user, according to bibliographic accession number, may be furnished either in microfiche or in hard copy reproduction. The retrospective index also provides subject matter and personal author indexes. An additional index provides a list of accession numbers for each corporate author.

**PB-289 986/2** **PC A07/MF A01**  
Ministerio de Planificaci6n y Politica Economica, Panama City (Panama). Dept. de Politica Cientifica y Tecnologica.  
**Diagnostico para el Desarrollo de Servicios de Informacion Cientifica y Tecnologica en Panama (Analysis of the Development of Scientific and Technological Services in Panama)**  
Final rept.  
Stella G. Dextre. Dec 77, 149p

Descriptors: \*Libraries, \*Panama, Surveys, Information services, Requirements, Librarians, Professional personnel, Objectives.  
Identifiers: Developing country application, \*Data banks.

An analysis is presented of all sectors concerned with scientific and technical information in

Panama. Survey recommendations are provided for information services in Panama, which are neither organized nor centralized. Research methodology includes interviews and survey instruments for existing library resources in such fields as mining, health, telecommunications, education, farming, and housing. Recommendations to fill the needs assessment include bibliographic bulletins, interlibrary loan, query response from a pertinent clearinghouse, and training of subject-matter librarians. Microform-, audiovisual-, and reprographic equipment is to be provided. Holdings of specific libraries are listed. For example, the University of Panama holds Chemical Abstracts, Nuclear Science Abstracts, and Excerpta Medica. The second part of this library survey and analysis quantifies the resources needed to implement the foregoing recommendations. Specific goals are the establishment of an industrial information center, an extension service to provide technical information to outlying sectors, and of data banks such as that being developed for agriculture. Strategy to obtain these goals includes a central coordinating office; this office should then become a member of international documentation organizations. Each Ministry should catalog its own publications; this would provide a basis for exchange of technical information in Panama, as well as selective dissemination of information with clearinghouses abroad.

**PB-289 987/0** **PC A04/MF A01**  
Farmer Cooperative Service, Washington, DC.  
**Improving Management of Farmer Cooperatives**

General rept. no. 120  
Milton L. Manuel. Jun 64, 55p  
Sponsored in part by Agency for International Development, Washington, DC. Office of Science and Technology.

Descriptors: \*Management, \*Organizations, \*Rural areas, Commerce, Agricultural economics, Rural sociology, Records management, Accounting, Budgeting, Auditing, Cooperation, Financial management, Capital, Industrial relations, Public relations.  
Identifiers: \*Cooperatives, \*Economic cooperation, Cooperative production and marketing systems, Organizational development, Developing country application.

The publication shows how management principles apply to local cooperatives and how they can be used to manage cooperatives successfully. It is intended specifically for managers and directors of these associations. The report also considers tools and techniques that can help put management principles into practice and gives suggestions for performing different management functions. Included in the tools are records and accounts, budgeting to meet various management needs, and the external audit.

**PB-289 988/8** **PC A02/MF A01**  
Department of Agriculture, Washington, DC.  
**Control de Niguas (Controlling Chiggers)**  
1973, 16p Rept no. USDA/BULL-137

Descriptors: \*Mites, \*Pest control, Insecticides, Life cycles, Pesticides.  
Identifiers: \*Chiggers, Developing country application, Trombicula.

Various aspects of the chigger including its life cycle, effect on humans and animals, and their control are discussed in depth. The areas/animals/humans most likely to be affected/infested with chiggers can be controlled with an insecticide spray (exact directions for application are given in bulletin) or an insect barrier made of ropes treated in insecticide. Man going into an area infested with chiggers can protect himself by applying insecticide to crucial areas of his clothing. If unable to take precautionary measures against attack, a bathing and medical program are discussed to help relieve discomfort.

**PB-289 989/6** **PC A04/MF A01**  
Instituto de Investigacion para la Accion en Vienda, Lima (Peru).  
**Construyendo con Ladrillo (Building with Brick)**  
Sep 77, 65p

Descriptors: \*Brick construction, \*Manuals, Construction, Houses, Construction materials, Mortars(Material), Admixtures, Tools, Walls, Doors, Windows, Protection, Earthquakes, Safety engineering, Electrical engineering, Installation.  
Identifiers: Developing country application.

The purpose of the manual is to present, in tutorial form, the concepts and procedures of engineering needed to construct a practical home at minimum costs and with maximum protection from the elements, including earthquakes. Covered in detail are: (1) Parts of the house and their purpose; (2) Basic materials needed for mortar and mixing formulas; (3) Tools; (4) Land preparation; (5) Floor and wall construction - which mortar and brick-laying techniques best; (6) Construction of an earthquake-proof wall with window/door reinforcements; (7) Safe construction of a home in proportion to size; (8) Electrical installation after completion of a brick structure; and (9) Repair of cracked wall.

**PB-289 990/4** **PC A03/MF A01**  
Department of Agriculture Extension Service, Washington, DC.  
**Rural Youth Clubs Around the World**  
1967, 42p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Youths, \*Rural areas, Project planning, Project management, Group dynamics, Quality of life, Organizing, Farm crops.  
Identifiers: Developing country application.

Rural youth work has been accepted as a way to introduce new ideas into rural life and train leaders and citizens for the future. Rural youth work is educational and aims at the total development of young people to prepare them for their role as useful citizens. A successful program is valuable to the youth who participate, the families involved, the community, and their country. Rural youth work is an effective way to close the gap between what is known about agriculture and home economics and what is actually practiced. This handbook shows how to establish, operate, and evaluate a rural youth program. Projects and special activities for youth groups are also discussed.

**PB-289 991/2** **PC A03/MF A01**  
Agency for International Development, Washington, DC. Community Development Div.  
**Community Development: An Introduction to Community Development for Village Workers, Series A, Volume 1**  
Community development series  
Donald L. Beran. Apr 62, 33p

Descriptors: \*Community development, \*Planning, Local government, Citizen participation, Meetings, Coordination, Instructional materials, Guidelines, Management, Organizing, Leadership.  
Identifiers: Developing country application, \*Villages.

The term community development is used to describe the approach many governments have employed to teach their village people and to make more effective use of local initiative and energy for increased production and better living standards. This booklet specifically was planned to give insights into aims, basic principles and elementary procedures in community development on which workshop procedures would be based. It offers a common-sense approach to local village development procedures.

**PB-290 239/3** **PC A06/MF A01**  
General Accounting Office, Washington, DC. International Div.  
**Population Growth Problem in Developing Countries: Coordinated Assistance Essential**  
Report to the Congress.  
29 Dec 78, 112p\* Rept no. ID-78-54

Descriptors: \*Population growth, \*Developing countries, Federal assistance programs, Foreign aid, Financing, Coordination, Cooperation, Leadership, Birth control, Sterilization, Organizations, Auditing.



Identifiers: \*Program coordination, \*Population control, Financial assistance, Voluntary organizations, Overpopulation.

Rapid population growth in developing countries impedes efforts to improve the quality of life. Many governmental, international, and private and voluntary organizations provide population assistance to an ever-increasing number of countries. Cumulative assistance could now total about \$2 billion; the United States alone provided about \$1.2 billion in the 1965-78 period. Because of the complexity of the problem and the many organizations involved, systematic coordination of assistance is essential to ensure that programs are as efficient and effective as possible. GAO recommends that the Agency for International Development work with the other major contributors and the developing countries to improve coordination, to reach agreement on leadership, strategy, and program responsibility, and to make sure that all participants are adequately informed of each other's activities.

**PB-290 348/2** PC A05/MF A01  
Stanford Univ., CA. Inst. for Communication Research.  
**An Annotated Listing of Training Institutions Offering Communications Courses to Developing-Country Personnel**  
Jeanne Moulton, and Peter Spain. Jul 78, 83p  
Contract AID/ta-C-1472

Descriptors: \*Schools, \*Radio broadcasting, \*Directories, Mass media, Education, Specialized training, Universities, United States, Foreign countries, Developing countries, Organizations.  
Identifiers: Curricula, Listings.

This document lists institutions in the U.S., Canada and Western Europe that either presently offer or have the potential to offer communication for development training. Emphasis was placed on training in broadcasting and in social science approaches to communication and development. Each institution is described briefly in terms of programs relevant to this survey, faculty and student activities, and interest expressed in further cooperation with USAID.

**PB-290 397/9** PC A12/MF A01  
Stanford Univ., CA. Inst. for Communication Research.  
**A Description of 15 U.S. Training Institutions Offering Communications Courses to Developing-Country Personnel (Based on Site Visits)**  
Jeanne Moulton, and Peter Spain. Jul 78, 268p  
Contract AID/ta-C-1472

Descriptors: \*Schools, \*Radio broadcasting, Mass media, Education, Specialized training, Universities, United States, Foreign countries, Developing countries.  
Identifiers: Curricula, Training programs.

Based on site visits, the purpose of this inventory is to provide information to the Development Support Bureau of the U.S. Agency for International Development about development communication training programs within the U.S. for students from developing countries. These programs might offer either graduate training at the Master's Ph.D. level or short-term non-degree training. The survey is limited to communication training in the electronic media and instructional technology, excluding print journalism. It does include training for communication research and policy planning.

**PB-290 419/1** PC A04/MF A01  
Natural Energy Association, Kingston upon Thames (England).  
**Natural Energy and Living, Number 2, 1978**  
Bob Todd, Peter Mullet, George McRobie, and Paul McClory. c1978, 53p

Descriptors: Wind power, Hydroponics, Solar heating, Buildings, Reviewing, Great Britain.  
Identifiers: \*Energy source development, Developing country application, Fuel reprocessing plants.

This small booklet will be of interest to those who are involved in the uses of natural energy. The booklet is the second in a series of four issues on the innovative uses of natural energy. Featured in

the booklet are articles on low energy use housing; the need for alternative energy technology; hydroponics; solar heat; the Windscale Follies and the advisability of setting up nuclear fuel reprocessing plants in the north of England; and a home built using solar panels, a wind generator, diesel set, and a steam engine.

**PB-290 420/9** PC A04/MF A01  
Natural Energy Association, Kingston upon Thames (England).  
**Natural Energy and Living, Number 3, 1978**  
Robin Clark, Mike Cooley, Michael Hobbs, and Alan Jones. c1978, 60p

Descriptors: Solar cells, Wood, Stoves, Land use, Solar heating, Wind power, Hot water heating, Great Britain.  
Identifiers: \*Energy source development, Developing country application, Wood burning stoves.

This booklet discusses the latest developments in the field of natural energy. The emphasis is on a simple, efficient, and ecology-minded technology. There is a round-up of current events occurring in natural energy plus features on solar cells, wood burning stoves, the land bond plan, and a technology for workers. Anyone interested in natural energy may find this booklet informative.

**PB-290 421/7** PC A10/MF A01  
National Research Council, Washington, DC. Board on Science and Technology for International Development.  
**Postharvest Food Losses in Developing Countries**  
Final rept.  
Dec 78, 217p Rept no. CIR/BOSTID-78/30  
Contract AID/csd-2584

Descriptors: \*Harvesting, \*Developing countries, \*Losses, \*Food, Farm crops, Estimates, Food processing, Grains(Food), Leguminous plants, Fisheries, Food consumption, Preserving, Conservation, Education, Specialized training, Recommendations.  
Identifiers: Agricultural extension services, Developing country application.

The study is devoted to assessing both the potential of food loss reduction efforts and their limitations. It summarizes existing work and information about losses of the major food crops and fish; discusses some of the economic and social factors involved; identifies major areas of need; and suggests various policy and program options for developing countries and technical assistance agencies. The study confirms that there is no known simple, inexpensive technology that can, by itself, make a profound impact on postharvest losses. On the contrary, postharvest food conservation can be achieved only through a combination of location-specific organization, problem identification, training, information, and adapted technology. Good conservation practice must be applied on a sustained basis, with continual refinement in response to new information. Significant worldwide reductions in food losses will result as the aggregate of these sustained national efforts, which should be given all possible support by bilateral and international technical assistance agencies.

**PB-290 422/5** PC A16/MF A01  
National Research Council, Washington, DC. Board on Science and Technology for International Development.  
**Postharvest Food Losses in Developing Countries: A Bibliography**  
Final rept.  
Dec 78, 371p Rept no. CIR/BOSTID-78/30A  
Contract AID/csd-2584

Descriptors: \*Harvesting, \*Developing countries, \*Losses, \*Bibliographies, \*Food, Farm crops, Estimates, Food storage, Food packaging, Food processing, Irradiation, Fumigation, Education, Specialized training, Insect control, Microorganisms, Rice, Wheat, Grains(Food), Fruits, Vegetables, Potatoes, Leguminous plants, Fisheries.  
Identifiers: Agricultural extension services, Developing country application.

The Bibliography is a companion volume to 'Postharvest Food Losses in Developing Countries'. The bibliography includes reported estimates of food losses; discussions of loss factors and vectors; papers describing methodologies for food loss assessment; specific food loss reduction procedures; aspects of training for loss reduction; other information sources; and references dealing with the economics of food conservation. The bibliography contains 2,100 entries focusing on the following commodities and food groups: grains (particularly maize, rice, and wheat); pulses and legumes; fruits and vegetables; roots and tubers; and fish. The bibliography contains a table of contents, author index, and country index. Many entries are annotated.

**PB-290 423/3** PC A15/MF A01  
Centro Nacional de Productividad, San Salvador (El Salvador).  
**Manual de Administracion para la Industria del Vestuario (Administrative Manual for the Clothing Industry)**  
1976, 342p

Descriptors: \*Management methods, \*Textile industry, Technical assistance, Production management, Sales management, Marketing, Financing, Accounting, Cost analysis, Time studies, Clothing, Manufacturing, Graphic methods, Manuals, Seasonal variations, Salaries.  
Identifiers: \*Business administration, \*Fashion industry, \*Organization size(Groups), Developing country application.

The manual was written to provide businessmen in the garment industry with methods and recommendations designed to improve their management techniques. These recommendations are derived from a study of several representative garment factories and are intended to aid in technical assistance work in the clothing field. Depending on the size and type of business, alternate techniques are presented. Special attention is devoted to production, financing, sales and marketing methods. Specific duties and responsibilities are listed for proprietors, sales managers and salesmen in relation to showroom sales, direct sales, wholesalers, retailers, and distributorships. Details are provided to set up an accounting system covering profit and loss, cost analysis, credit and/or cash sales, monthly reconciliation of bank statements, and statement of net worth. Graphics explain planning and controlled production, sales campaigns for special holidays (Christmas) and seasonal events (return to school). Time and motion studies are provided for garment cutters and quality control of the same. An appendix is devoted to the calculation of the actual cost of labor by noting that salary includes vacation pay and social security payments.

**PB-290 424/1** PC A03/MF A01  
Instituto de Investigacion Tecnologica Industrial y de Normas Tecnicas, Lima (Peru).  
**La Investigacion Tecnologica Industrial en el Peru. Analisis y Comentarios (Industrial Technological Research in Peru. Analysis and Comments)**  
Oct 75, 34p Rept no. POLITICA  
TECNOLOGICA-4

Descriptors: \*Technology, \*Research, \*Peru, Finance, Resource allocation, Product development, Marketing, Technology transfer, Information services, Imports, Capital, Documentation, Problem solving, Government policies.  
Identifiers: \*Industrial technology, Developing country application, Gross national product.

Ten reports dealing with the solution of technological problems of Peruvian industry are presented. The importance of an industrial technology policy is stressed. Budgetary allocations should be made for this purpose; capital can be accumulated through developing and marketing new products and processes, thereby creating new markets. Technology transfer, technical information repositories, documentation clearinghouses and abstract journals are cited in relation to availability of information and the time lag between capture and dissemination of technical data. Services offered by the National University of Engineering (Peru) are outlined in reference to basic research. Graphics



are presented on the present-day 'second' industrial revolution in relation to the gross national product. It is noted that industrial automation does not create unemployment but does provide a method to shorten the technology gap. Technological research can improve industrial processes by utilizing domestic materials instead of more costly imported materials.

**PB-290 425/8** PC A07/MF A01  
Instituto de Investigaciones Tecnológicas, Bogotá (Colombia).

**Memoria del Seminario sobre Desarrollo de Tecnología Industrial (Report of the Seminar on Development of Industrial Technology)**  
Jorge Ramirez Ocampo, Jorge Mendez Munevar, Oswaldo Parra Morales, and Francisco Piedrahita E. Feb 75, 138p

Descriptors: \*Technology innovation, \*Industries, \*Colombia, Research management, Financing, Resource allocation, Exports, Marketing, Publicity, International relations, Government policies, Technical assistance, Socioeconomic status, Information services.  
Identifiers: \*Research and development, \*Industrial technology, Scientific enterprise, Developing country application.

A seminar was held on 12-13 February 1975, in Colombia, S.A., to discuss the development of industrial technology. The main objectives were to form an industrial science and technology policy, and to analyze problems related to this development in view of the country's need to raise its socio-economic level. Seminar topics included financing of technological development, the industrial technology system regarding promotion of exports, Colombia's position within the Andean Group, technology and the industrial sector, and the relationship of foreign businesses with Colombia's technological development. Conclusions and recommendations covered financing through budgetary allocation; strengthening local technological capability (e.g., constructing plants and providing consulting services); strengthening domestic demand for science and technology works (e.g., acquisition and analysis of technological information); directing such activities toward priorities of the country; and the formation of a national science and technology policy.

**PB-290 426/6** PC A07/MF A01  
Fondo Colombiano de Investigaciones Científicas y Proyectos Especiales, Bogotá.  
**Ciencia Tecnología y Desarrollo, Volume 2, Numero 1, Enero-Marzo, 1978 (Technological Science and Development, Volume 2, Number 1, January-March 1978)**  
Fernando Chaparro O, Dario Mesa, and Luis J. Jaramillo S. 2 Apr 78, 143p

Descriptors: \*Technology, \*Economic development, \*Developing countries, Research management, Government policies, Regulations, Businesses, Universities, Political systems, Information services, Technology transfer, Assessment, Japan, Colombia.  
Identifiers: \*Research and development, Scientific enterprise, Information dissemination, Developing country application, Industrial technology.

The technical journal consists of an editorial and five articles. The editorial discusses the technological and scientific revolution of the present day and puts into sharp focus the economic differences between the developed and the developing countries. The first article cites three types of institutions involved in a national policy on science and technology: those setting policy and furthering scientific works, those regulating the import of technology, and those directly involved in science and technology activities. The second article discusses the good relations involving science, technology and the university in terms of politics, economics, and governmental authority. Based on conferences, interviews and observation, the third article discusses technology dissemination in Japan and its pertinence to Colombia. The fourth article deals with technology assessment related to Latin America. Methodology and alternative technology are briefly discussed. Ten years of work of the committee on technology transfer is briefly covered in the fifth article.

**PB-290 509/9** PC A24/MF A01  
International Road Federation, Washington, DC.  
**World Survey of Current Research and Development on Roads and Road Transport (1978). A Report Covering an Inventory of 59 Countries**  
Annual rept. for 1978.  
Dec 78, 574p\* FHWA/RD-79/38  
Contract DOT-FH-11-8893  
Prepared in cooperation with Organization for Economic Co-Operation and Development, Paris (France). and Transportation Research Board, Washington, DC.

Descriptors: \*Roads, \*Highway transportation, Research projects, Foreign countries, Transportation management, Highway planning, Construction, Pavements, Materials, Maintenance, Urban transportation, Traffic engineering, Traffic safety, Land use.  
Identifiers: Road materials, Foundation engineering, Roadside development, Transportation corridors, Transportation planning.

This is the 13th in a series of annual reports on inventories of research and development projects conducted by governmental, academic and commercial research organizations in 59 countries, as reported by surveyors of the International Road Federation, the International Road Research Documentation program of the OECD, and the HRIS. It is the only publication that reports world-wide information on current research activities in the highway field. The report lists 5,609 projects, classified in accordance with the subject area classification system of the Transportation Research Board.

**PB-290 620/4** (Order as PB-290 619, PC A16/MF A01)

North Carolina Fisheries Association, Inc., New Bern.  
**Fish Flakes Offer New Possibilities for Finfish Utilization**  
Norman B. Angel, and Ted M. Miller. Sep 78, 7p NOAA-78122022-1  
Prepared in cooperation with Marine Chemurgics, Newport, NC.  
Included in Proceedings of the Annual Tropical and Subtropical Fisheries Technological Conference of the Americas (3rd) Held in New Orleans, LA on April 23-26, 1978, p1-6. Sea Grant Program Report No. TAMU-SG-79-101, PB-290 619.

Descriptors: \*Fishes, \*Food processing, Seafood, Frozen food, Quality.  
Identifiers: \*Fish flakes, Precooked meats.

It appears that properly frozen and protectively-packaged whole fish will be suitable for preparing fish flakes, since no appreciable difference has been noticed by those comparing flakes made from fresh fish and flakes from frozen fish. There is already evidence that well-prepared fish flakes are capable of improving other seafoods when used in pre-cooked products. The investigators are increasingly disposed to insist that fish flakes can become valued ingredients for high-quality products and should not be considered 'extenders.'

**PB-290 621/2** (Order as PB-290 619, PC A16/MF A01)

Florida Univ., Gainesville. Dept. of Food Science and Human Nutrition.  
**'Sea Dog' Made with Minced Mullet and Textured Soy Flour**  
L. H. Daley, and J. C. Deng. Sep 78, 11p NOAA-78122002-2  
Included in Proceedings of the Annual Tropical and Subtropical Fisheries Technological Conference of the Americas (3rd) Held in New Orleans, LA on April 23-26, 1978, p7-16. Sea Grant Program Report No. TAMU-SG-79-101, PB-290 619.

Descriptors: \*Fish protein concentrates, \*Seafood, Soy beans, Flours(Food), Food additives, Acceptability.  
Identifiers: Sea Grant program, Mugil cephalus.

Annual harvests of the black mullet species (*Mugil cephalus*) are approximately 30 million pounds in Florida. Utilization of mullet has been limited, however, primarily because of the rapid on-set of rancidity during storage. The species also has a strong flavor which is objectionable to many people. Other drawbacks include a color problem and a low flesh yield. The 'Sea Dog', a sausage product, was designed to overcome these limitations of the mullet species. The sausage manufacture requires no special equipment, particularly important in Florida where most seafood dealers are small businessmen who cannot afford large capital expenses. The sausage studied here differs from the previous products in that it contains neither added starch nor fat. Another distinguishing feature is the addition of up to 30% (by weight) of rehydrated textured soy flour as an extender to decrease manufacturing costs. The purpose of this study was to examine the effect of three factors (soy, water, and sodium tripolyphosphate) on the sensory acceptability of the sausage product.

Florida Univ., Gainesville. Dept. of Food Science and Human Nutrition.  
**Storage Stability of a 'Sea Dog' Made from Minced Mullet**  
L. H. Daley, and J. C. Deng. Sep 78, 13p NOAA-78122002-3  
Included in Proceedings of the Annual Tropical and Subtropical Fisheries Technological Conference of the Americas (3rd) Held in New Orleans, LA on April 23-26, 1978, p17-28. Sea Grant Program Report No. TAMU-SG-79-101, PB-290 619.

**PB-290 622/0** (Order as PB-290 619, PC A16/MF A01)

Florida Univ., Gainesville. Dept. of Food Science and Human Nutrition.  
**Storage Stability of a 'Sea Dog' Made from Minced Mullet**  
L. H. Daley, and J. C. Deng. Sep 78, 13p NOAA-78122002-3  
Included in Proceedings of the Annual Tropical and Subtropical Fisheries Technological Conference of the Americas (3rd) Held in New Orleans, LA on April 23-26, 1978, p17-28. Sea Grant Program Report No. TAMU-SG-79-101, PB-290 619.

Descriptors: \*Fishes, \*Food storage, Shelf life, Flours(Food), Soy beans, Acceptability, Proteins.  
Identifiers: Sea Grant program, Mugil cephalus.

The sausage product ('Sea Dog' made with minced mullet and textured soy flour) was designed to overcome the drawbacks of the mullet species as well as to be acceptable to the U.S. population. The purpose of this study was to estimate the shelf life of the product at 35 F to determine the feasibility of marketing. The storage study was designed to compare the effect of (1) hand filleted or mechanically deboned mullet flesh, (2) a liquid smoke flavoring at levels of 0% or 0.5% and (3) a textured soy flour at the 0% or 19.5% level. Deboned flesh was studied because the recent development of mechanical deboning machines for fish can substantially increase flesh yields thus reducing the cost of raw materials. Liquid smoke flavoring was included because it has been reported to inhibit rancidity development and microbial growth while improving the sensory acceptability.

**PB-290 623/8** (Order as PB-290 619, PC A16/MF A01)

Georgia Univ., Brunswick. Marine Extension Service.  
**Process Development for a Foreign Marketable Fish Product from Underutilized Fish**  
Keith W. Gates, and C. M. Arnold Wu. Sep 78, 17p NOAA-78122002-4  
Included in Proceedings of the Annual Tropical and Subtropical Fisheries Technological Conference of the Americas (3rd) Held in New Orleans, LA on April 23-26, 1978, p29-44. Sea Grant Program Report No. TAMU-SG-79-101, PB-290 619.

Descriptors: \*Seafood, \*Food processing, Fishes, Bass, Soy beans, Flours(Food), Fats, Food storage.  
Identifiers: Sea Grant program, \*Fish flakes.

Yu-sone, a seasoned semi-dried, and ground fish flake produced for centuries by hand operations in Oriental cultures can be manufactured from fish of any size that have a relatively low fat content. The traditional raw material is bass that is headed, gutted, steamed or boiled, drained, deboned, and disintegrated into small pieces. The loose fish fiber is then sauteed with flour, sugar, soy sauce, and traditional spices until dry and spongy. Two species of fish, mullet and croaker, that are landed in abundance along with Southeastern and Gulf coasts of the United States were chosen as raw materials for the pilot studies in Yu-sone production. Both species are underutilized. Two extremes in fat content were chosen to ascertain any differences in final product rancidity during storage at room temperature.



# APPROPRIATE TECHNOLOGY ABSTRACTS

**PB-290 634/5**

(Order as PB-290 619, PC A16/MF A01)

Texas A and M Univ., College Station.  
**Bioeconomic Assessment of a Poultry and Tilapia Aquaculture System**

Robert G. Anderson, Wade L. Griffin, Robert R. Stickney, and Robert E. Whitson. Sep 78, 17p  
NOAA-78122002-15

Included in Proceedings of the Annual Tropical and Subtropical Fisheries Technological Conference of the Americas (3rd) Held in New Orleans, LA on April 23-26, 1978, p126-141. Sea Grant Program Report No. TAMU-SG-79-101, PB-290 619.

Descriptors: \*Aquaculture, \*Fresh water fishes, \*Fish protein concentrates, \*Food, Poultry, Food processing, Assessments, Economic factors, Sewage, Growth.  
Identifiers: Sea Grant program, \*Tilapia aurea.

Tilapia aurea are especially suited for use in sewage/aquaculture facilities, since once past fingerling size, they feed directly on phytoplankton. The incorporation of tilapia into ponds whose primary purpose is sewage treatment may actually improve the water quality. Tilapia have potential as a component of livestock feed, fish meal or directly as human food, although there is not a developed market for tilapia in the United States. The requirements of the fish meal industry best fit the characteristics of tilapia and may represent the most likely early market. This study examines the economic relationships in a commercial poultry egg production facility with a liquid manure handling system that provides for the growth and harvesting of tilapia. The actual structure of the poultry sewage/aquaculture facility is hypothetical since a commercial facility does not exist at present. However, the major individual components of a proposed system are well understood from current research and the important interface of poultry sewage and tilapia growth is currently under intensive study.

**PB-290 654/3**

**PC A07/MF A01**

Alabama Dept. of Conservation and Natural Resources, Gulf Shores. Claude Peteet Mariculture Center.

**Experimental Pond Production of Selected Marine Species**

Completion rept. Jul 75-Sep 78  
William C. Trimble, and Walter M. Tatum. Nov 78, 136p NOAA-78122001

Descriptors: \*Ponds, \*Aquaculture, Brackish water, Marine fishes, Trout, Shellfish, Shrimps, Minnows, Feeding stuffs, Growth, Temperature, Photoperiodism, Circulation, Survival, Alabama.  
Identifiers: Bait fish.

During 1975-1978, ten marine species were evaluated as mariculture candidates at Alabama's Claude Peteet Mariculture Center at Gulf Shores, Alabama. The site, to investigate brackish water food production, as well as bait production, was selected on traditionally agricultural land adjacent to the Gulf Intracoastal Waterway. Earthen ponds were selected as initial experimental units for production and were filled with brackish water from the Waterway. Candidates selected for culture for research conducted during 1975-1978 included: Florida pompano (*Trachinotus carolinus*), penaeid shrimp (*Penaeus aztecus*, *P. duorarum*, *P. setiferus*, and *P. vannamei*), gulf killifish or 'bull minnow' (*Fundulus grandis*), rainbow trout (*Salmo gairdneri*), red drum or 'redfish' (*Sciaenops ocellata*), red snapper (*Lutjanus campechanus*), and river shrimp (*Macrobrachium ohione*).

**PB-290 760/8**

**PC A12/MF A01**

Lockheed-California Co., Burbank.

**Conversion and Storage of Wind Energy as Nitrogenous Fertilizer**

Final rept.  
Michael B. Dubey. Nov 78, 264p Rept no. LR-28338  
Contract NSF-C-75-22186

Descriptors: \*Ammonia, \*Ammonium nitrate, \*Wind power generation, Hydrogen production, Electrolysis, Fertilizers, Environmental surveys, Design criteria, Energy storage, Manufacturing, Process charting, Technology, Chemical industry,

Storage, Performance evaluation, Capitalized costs, Economics, Comparison.  
Identifiers: Chemical feedstocks, State of the art.

Wind energy, air and water can be combined to make anhydrous ammonia and ammonium nitrate, two important nitrogenous fertilizers that are usually synthesized using natural gas as the primary feedstock. In the study concept, wind energy is captured by a wind turbine and converted to electricity. The electricity generates hydrogen and oxygen by water electrolysis. The hydrogen is stored in sufficient quantity to serve as chemical feedstock and energy to manufacture anhydrous ammonia or ammonium nitrate solution.

**PB-291 515/5**

**PC A04/MF A01**

Stanford Univ., CA. Communications Satellite Planning Center.

**Manpower Forecasting Model for Educational Planning**

Technical rept.  
James Boettcher, and Lawrence T. Brekka. Dec 76, 73p Rept no. TR-13  
Contract NIRT-1

Descriptors: \*Education, \*Models, \*Manpower, Forecasting, Radio broadcasting, Television systems, Specialized training, Requirements, Farms, Mass media, Instructional materials, Iran, Developing countries.  
Identifiers: Teaching methods.

The National Cropping Plan of Iran is reviewed to define the critical improvements in farming techniques required to meet food production needs. Changes that depend on the education of Iran's small farmers are isolated and organized into a series of informational programs for television or radio. Iranian and International Agricultural experts outline over 150 program segments covering the critical practices. The program segments are organized into eight broadcast area schedules to suit the agro-climatic conditions and crop selections in different parts of the country. The procedures to organize the program information and broadcast schedules and much of the subject content itself is felt to be applicable to other developing agricultural countries.

**PB-291 554/4**

**PC A02/MF A01**

Carnegie-Mellon Univ., Pittsburgh, PA. Interdisciplinary Working Party.

**CMU/Intertect Ultra Low Cost Shelters in Relief Situations in Bangladesh**

Charles H. Goodspeed, Volker H. Hartkopf, and Frederick C. Cuny. May 77, 18p  
Contract AID/TA-C-1174, AID/TA-C-1345  
Prepared in cooperation with Intertect, Dallas, TX.

Descriptors: \*Shelters, \*Developing countries, \*Bangladesh, Housing planning, Construction, Citizen participation, Guidelines, Technical assistance, Technology innovation.  
Identifiers: Emergency planning, Developing country application.

This is a report to the Agency for International Development on the two-year evaluation of the CMU/Intertect refugee shelter field test in Bangladesh. The test shelters were built during Spring, 1975, and revisited during Spring, 1977.

**PB-291 588/2**

**PC A02/MF A01**

Collier's Earthworm Compost System, Inc., Santa Clara, CA.

**Conversion of Municipal Wastewater Treatment Plant Residual Sludges into Earthworm Castings for Use as Topsoil**

Annual rept. no. 1, 15 Jul 77-14 Jul 78  
Jack E. Collier. 14 Jul 78, 21p NSF/RA-780346  
Grant NSF-ENV77-16832

Descriptors: \*Worms, \*Composts, \*Sludge digestion, \*Soil stabilization, \*Sewage treatment, \*Vegetable crops, Sludge disposal, Invertebrates, Plant growth, Breeding, Feasibility, Soil analysis, Metals, Field tests, Harvesting, Cost analysis, Soil fertility, Demand(Economics), Evaluation.  
Identifiers: \*Vermicomposting, Earthworms, Heavy metals.

This experiment demonstrates the physical abilities of earthworms to convert sizable amounts of

municipal sewage sludges into worm manure, a stabilized soil known as castings. The process of composting wastes with domesticated earthworms under controlled conditions, called vermicomposting, is believed by the investigator to be an efficient and economical method of recycling sludges and other organic wastes. The report describes the conditions of the experiment and a summary of findings. These include longevity tests of redworms in sludge, pathogen tests, handling and harvesting techniques, plant growth comparisons, breeding rates in sludge, optimum worm density, product demand, heavy metals analysis, and soil temperatures. In a review of principal findings it is indicated that vermicomposting offers a much higher degree of stabilization over other conventional thermal composting methods. The report also lists publications, conferences, and new objectives.

**PB-291 846/4**

**PC A05/MF A01**

ACTION/Peace Corps, Washington, DC.

**Programming and Training for Small Farm Grain Storage**

Program and training journal manual series  
Carl J. Lindblad. Sep 78, 100p Rept nos.  
ACTION/PAM-4200.27, MANUAL SER-2B

Descriptors: \*Storage, \*Grains(Food), \*Specialized training, \*Farms, Manuals, Moisture content, Pest control, Insects, Rodents, Drying, Losses, Heat, Fungi, Birds.  
Identifiers: Developing country application.

Although grain storage program conception and objectives will vary from country to country and within each country, there are basic objectives which will be present in every grain storage program. These include: (1) to preserve the quantity of the harvest, (2) to maintain its quality, and (3) to result in the highest possible sale value for whatever grain is sold or traded. This book is designed to aid in identifying storage problems and devising solutions to them. The approach favors techniques based on the local needs and resources of the farmer. Basic subject areas discussed are the maintenance of storage hygiene; the control of grain moisture; and the specific control of grain pests such as insects, birds, and rodents.

**PB-291 857/1**

**PC A11/MF A01**

ACTION/Peace Corps, Washington, DC.

**Self-Help Construction of 1-Story Buildings**

Program and training journal manual series  
Peter Gallant, Nancy Bergau, Peter Hunt, and Jim Seaton. 1977, 244p Rept no. MANUAL SER-6

Descriptors: \*Residential buildings, \*Housing planning, \*Developing countries, Design, Quality of life, Project planning, Construction management, Construction materials, Toilet facilities, Foundations.  
Identifiers: \*Developing country application.

This manual is designed to assist a community or a family to: (1) plan and design a one-story building for present and future needs, (2) assess the advantages and disadvantages of locally available construction materials, (3) draw and understand their own construction plans; and (4) successfully complete construction according to their own plans. The focus is on basic principles of construction with materials that are low-cost, available in many parts of the world, and easy to work with. It is illustrated to help make the processes easier to visualize. These buildings are specifically designed for developing countries and do not necessarily meet building code requirements.

**PB-291 858/9**

**PC A20/MF A01**

Environmental Protection Agency, Cincinnati, OH.  
Office of Technology Transfer.

**Manual de Metodos para el Analisis Quimico de Aguas y Desechos (Manual of Methods for Chemical Analysis of Water and Wastes)**

Jul 76, 459p

Descriptors: \*Manuals, \*Water analysis, Chemical analysis, Surface waters, Waste water, Industrial wastes, Water pollution, Arsenic, Boron, Bromides, Chlorides, Colors, Organic compounds, Inorganic compounds, Monitoring, pH, Cyanides, Dissolved



gases, Fluorides, Iodides, Metals, Trace elements, Oils, Nitrogen, Phosphorus.

Identifiers: \*Water pollution detection, \*Procedures, Biochemical oxygen demand, Chemical oxygen demand, Developing country application.

This second edition of this manual contains the chemical analytical procedures used in U.S. Environmental Protection Agency Laboratories for the examination of ground and surface waters, domestic and industrial waste effluents, and treatment process samples. The manual provides test procedures for the measurement of physical, inorganic, and selected organic constituents and parameters.

**PB-291 939/7** PC A04/MF A01  
ECOS, Inc., Boston, MA.

**Community Water Management, Research Needs for Small and Urbanizing Communities**  
David A. Del Porto. Jul 78, 70p NSF/RA-780372

Descriptors: \*Water supply, \*Water quality management, \*Urban areas, Sewage treatment, Prices, Water conservation, Conflicts, Waste water reuse, Aquaculture, Water consumption, Toilet facilities, Water treatment, Ground water.  
Identifiers: Water demand, Water costs.

Various methods of approach in dealing with the water needs of small and urbanizing communities are outlined. One section is devoted to water quality issues, such as types of contamination and sources of pollution. Another, entitled Supply, Demand, and Use concerns historical perspectives of wastewater management, the re-definition and semantics of supply and demand, the conflict of environment vs. energy, and economic considerations. Other sections analyze future trends and viable alternatives to the flush toilet such as compost systems. Wastewater aquaculture and community planning are considered as alternative futures.

**PB-292 393/6** PC A07/MF A01  
Environmental Protection Agency, Washington, DC. Facility Requirements Div.

**Municipal Wastewater Management. Public Activities Guide**  
Technical rept.

Clem L. Rastatter, John Hammond, and Larry McBennett. Feb 79, 126p\* Rept nos. EPA/430/9-79/005, FRD-7

Descriptors: \*Citizen participation, Water pollution control, Public utilities, Facilities, Planning, Decision making, Communities, Government policies, National government, Waste water, Handbooks, Guidelines.  
Identifiers: \*Sewage treatment plants.

This Handbook was prepared for use in a training program to acquaint citizen leaders with the important decisions that are made in planning for the management of municipal wastewater. The training program was designed to: (1) Identify the key decisions throughout the planning process that are critical to the outcome of that process and to the community's future; (2) Identify and analyze the environmental, economic, and social considerations that affect these important decisions; (3) Facilitate citizen input to those decisions by stripping the process of technical jargon, and helping the reader understand the community judgments that must be made; and, (4) Help citizens understand the legal tools and participatory techniques that will facilitate their involvement in the planning process.

**PB-292 394/4** PC A12/MF A01  
Environmental Protection Agency, Washington, DC. Facility Requirements Div.

**Municipal Wastewater Management. Citizen's Guide to Facility Planning**  
Technical rept.

Clem L. Rastatter, John Hammond, and Larry McBennett. Jan 79, 259p\* Rept nos. EPA/430/9-79/006, FRD-6

Descriptors: \*Citizen participation, Water pollution control, Public utilities, Facilities, Planning, Decision making, Communities, Government policies, National government, State government, Local

government, Regulations, Legislation, Waste water, Handbooks, Guidelines.

Identifiers: \*Sewage treatment plants, Clean Water Act.

This Handbook is organized around a logical progression of questions that the involved citizen or local governmental official is likely to encounter in trying to influence the municipal sewage facilities planning process. The Handbook reflects the latest federal regulations and policies, as of January 1979, and assumes a level of interest that is more than casual on the part of the reader.

**PB-292 585/7** PC A03/MF A01  
French (David), Washington, DC.

**Appropriate Technology in Social Context: An Annotated Bibliography**  
David French. Aug 77, 41p  
Contract AID/otr-147-77-77

Descriptors: \*Technology, \*Bibliographies, Technical assistance, Developing countries, Agriculture, Fisheries, Water resources, Water supply, Community development, Family relations, Health, Culture (Social sciences), Rural areas, Technology innovation, Social change, Farms, Livestock, Farm management, Economic development.  
Identifiers: \*Appropriate technology, Developing country application, \*Villages, Case studies.

The consistency of a technology with its social environment is the subject of this bibliography. The term 'social context' refers to the whole set of shared values, beliefs, and institutions that join people in common endeavor. The many case studies in this bibliography offer the opportunity to match technology and society.

**PB-292 586/5** PC A04/MF A01  
Academy for Educational Development, Washington, DC. Clearinghouse on Development Communication.

**Communication Media and Technology: A Look at Their Role in Non-Formal Education Programs**  
Information bulletin  
Henry T. Ingle. Aug 74, 69p Rept no. IB-5

Descriptors: \*Specialized training, \*Mass media, Education, Personnel development, Radio communication, Television broadcasting, Mass communication, Quality of life.  
Identifiers: Developing country applications, Educational games.

The purpose of this publication is to review the role communication media and technology have played in the area of non-formal education. Specific instances are cited in which media and technology are being used in non-formal educational projects around the world, along with background information on each of these efforts with particular emphasis being given to projects in the developing regions of the world. Discussed is the need for a non-formal approach to education as well as the implications of such an approach. Included is a review of the different types of media and technology which have been used or are currently being used in non-formal programs.

**PB-292 587/3** PC A04/MF A01  
Natural Energy Centre, Kingston upon Thames (England).

**How to Use Natural Energy**  
Paul McClory, J. C. McVeigh, W. G. Jack, Kuno Tichatschek, and Anthony Wiggins. c1978, 61p\*  
Sponsored in part by Agency for International Development, Washington, DC. Also pub. as ISSN-0-9506107-1-2.

Descriptors: Solar energy, Wind power, Hydroelectric power, Heat pumps, Heat recovery, Thermal insulation, Methane, Biomass, Swimming pools, Space heating, Electric power generation, Reviews, Great Britain.

Identifiers: \*Renewable energy sources, \*Energy conservation, Bioconversion, Heat pipes, Waste heat utilization.

This booklet is for those who wish to take an active part in the natural energy field or to be regularly informed of the latest developments on all aspects

of energy conservation, self-sufficiency, and the environment. The objective is to promote a wide range of products which use natural energy as a primary source of fuel and to help conserve reserves of fossil fuels. The emphasis is to combine optimum combinations of quality and cost-effectiveness. Some of the topics discussed in this booklet include: solar heating; power from the wind; water power; heat pumps; waste heat recovery; heat wheels; and home insulation.

**PB-292 590/7** PC A05/MF A01  
Marine Univ. at Orono. Cooperative Extension Service.

**Taking Care of Wooden Ships**  
Maynard Bray. Jan 78, 85p\* NOAA-79010502  
Grant NOAA-04-8-MO1-79

Descriptors: \*Ships, \*Maintenance, Wood, Wood preservatives, Coating processes, Caulking, Guidelines.  
Identifiers: Constitution vessel, Clearwater vessel, Sea Grant program.

Two papers and discussions are presented on the care of old and relatively new wooden ships. The first was taken with some editing from the proceedings of the Bath Marine Museum's Symposium on American Maritime History, held on May 6-8, 1977, and mainly concerns the maintenance of the U.S.S. Constitution. The second paper is a manual for the maintenance of the Hudson River Sloop Clearwater prepared in 1976 by Maynard Bray. Special care of wooden ships is a skill now limited to a few and efforts are being made to perpetuate these skills.

**PB-292 594/9** PC A02  
Florida Dept. of Natural Resources, St. Petersburg. Marine Research Lab.

**Effects of Stocking Size and Density on Growth and Survival of 'Macrobrachium rosenbergii' (De Man) in Ponds**  
Scott A. Willis, and Mark E. Berrigan. 1978, 15p  
CONTRIB-289, NOAA-78122801

Descriptors: \*Aquaculture, \*Shellfish, Growth, Survival, Density (Mass/volume), Ponds, Weight (Mass), Mortality, Florida.  
Identifiers: \*Macrobrachium rosenbergii.

Postlarval and juvenile *Macrobrachium rosenbergii* were stocked in twelve 0.025 ha earthen ponds to study the effects of stocking size and density on growth and survival. The experiment was comprised of four treatments, three replicates each. One treatment consisted of juveniles (0.760-0.792 g) stocked at 5/sq m. The remaining treatments were postlarvae (0.044-0.063 g) stocked at 5, 10, and 20/sq m. Following each four week sampling interval, feeding rates were adjusted based on mean body weight and an estimated 5% mortality. All ponds were fed Purina Marine Ration 25 at rates of 30, 15, 8, 4, 2, and 2% body weight for each respective sampling interval during the 24 week study. Juveniles grew to a mean weight of 43.256 g while postlarvae reached 29.749 respectively. Survival ranged from 38 to 92% and final feed conversion ratios ranged from 1.88:1 to 0.96:1. The maximum equivalent production of 2278.61 kg/ha occurred in ponds stocked with 20/sq m.

**PB-292 664/0** PC A03/MF A01  
Andrews (George H.) Engineering Associates, Inc., Washington, DC.

**Plant Requirements to Set Up and Operate a Small Community Electric System**  
May 59, 32p  
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Electric power plants, Requirements, Electric generators, Electric power generation, Electric power distribution, Revenue, Electric utilities, Investments, Profits.  
Identifiers: Developing country application, \*Villages.

The purpose of the manual is to provide information for establishing electric systems in small villages where such services are not now available.



Small electric generators are available that can be used in building systems that will meet the needs of small villages. These systems would be based on the number of homes and stores to be lighted, the number of street lights required, the power requirements of local industries and the estimated expansion requirements. These small electric systems will provide a valuable service to such villages by producing and distributing power at a cost that the average community can afford. Under reasonable conditions, such as those assumed for the plant in this manual, either public operation or private operation would be practicable. Such an electric plant will produce revenue to amortize the investment and at the same time provide an operating profit of more than 15 percent. For the entrepreneur there is an opportunity to invest money, on which he will earn a satisfactory return, have employment at a fair salary, and at the same time be increasing the value of his property. This revised version of the manual includes current costs of labor, machinery, equipment and supplies, as well as additional information relative to engineering, training, safety, markets, sales, financial and economic factors. The manual is designed to provide a general picture of the factors which must be considered in establishing and operating a small-scale plant of this type. It should prove useful in creating interest in the subject, and serve to give enough understanding of the related considerations to help government officials, other leaders and businessmen to determine whether the potential deserves more-detailed attention.

**PB-292 665/7** **PC A02/MF A01**  
 Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements for Manufacture of Surgical Instruments**  
 Sep 61, 13p  
 Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Surgical instruments, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Industrial management, Production planning, Cost estimates.  
 Identifiers: Developing country application.

The document gives information on the production and plant requirements for the manufacture of surgical instruments including plant layout. Assumption of production at a minimum volume level is made. Most basic instruments have been carefully selected and a list is given. The report is one of a series of reports resulting from overseas technical inquiries on factory, operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 666/5** **PC A03/MF A01**  
 Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements for Manufacture of Salicylic Acid**  
 Sep 61, 33p  
 Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Chemical industry, \*Industrial plants, \*Manufacturing, \*Salicylic acids, Requirements, Production management, Production methods, Production capacity, Operating costs, Process charting, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
 Identifiers: Developing country application.

The purpose of the report is to present basic information for establishing and operating a chemical plant in a foreign country for the production of salicylic acid. In the United States salicylic acid is manufactured in three quality grades: technical, crystallized and sublimed (USP). All three of these

grades can be manufactured in this plant. Since the technical grade acid has the largest use, all facts and figures shown in this report will be based on the production of technical grade acid. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 671/5** **PC A03/MF A01**  
 United State Testing Co., Inc., Hoboken, NJ.  
**Plant Requirements for Processing Potato Chips**  
 Apr 62, 43p  
 Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div.

Descriptors: \*Industrial plants, \*Food processing, \*Manufacturing, Requirements, Potatoes, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Sanitation, Safety engineering.  
 Identifiers: Developing country application, \*Potato chips.

The purpose of the report is to present basic information for establishing and operating a manufacturing plant in a foreign country to produce potato chips. In the United States, the plant outlined in this report is considered small to medium-sized. Other typical United States plants are more mechanized and have higher production rates. A plant of this kind, if built in a foreign country, could use less equipment and require more labor but a smaller capital investment. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 675/6** **PC A03/MF A01**  
 Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements for Manufacture of Crochet and Knitting Yarns**  
 1961, 34p  
 Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Yarns, Carded yarns, Combed yarns, Cotton spun yarns, Requirements, Production management, Production methods, Production capacity, Operating costs, Cotton fibers, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Spinning (Staple fibers), Textile processes, Carding, Combing, Rovings, Winding, Reeling.  
 Identifiers: Developing country application.

The purpose of the report is to present basic information for establishing a manufacturing plant, in a foreign country, to produce crochet and knitting yarns. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the

factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 676/4** **PC A02/MF A01**  
 Office of Technical Services, Washington, DC.  
**Plant Requirements for Manufacture of Tungsten Carbides**  
 Nov 55, 16p  
 Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Tungsten carbides, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Sintering, Metal shapes.  
 Identifiers: Developing country application.

In its broad outline, the process on making tungsten carbide cutting tools, wire drawing dies, header dies, gages and other industrial products consists of preparing the powder carbide of tungsten, mixing it with a binder (such as cobalt) into compacts of desired forms, and sintering these to get the desired shapes, hardness, strength and other attributes. Though this pattern appears simple, it soon becomes evident from a detailed study that the techniques involved are different from those generally used in powder metallurgy. A survey was made among the manufacturers of the necessary equipment, and technicians experienced in carbide making, and the steps established as the pattern peculiar to this industry are explained in the report. The report is one of a series of reports resulting from overseas technical inquiries on factory establishments, operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 688/9** **PC A04/MF A01**  
 Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements for Manufacture of Rubber Fabric Canvas Shoes**  
 May 59, 55p

Descriptors: \*Industrial plants, \*Manufacturing, \*Shoes, Requirements, Elastomers, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Sewing, Woven fabrics, Fabrics.  
 Identifiers: Developing country application, \*Sneakers, \*Tennis shoes.

There are many different designs of rubber sole fabric shoes produced in the United States. The shoe made in the plant described in the report is a simple circular vamp oxford with a rubber sole. This shoe is commonly referred to as a tennis shoe or 'sneaker' in the United States and this type of rubber sole shoe is widely used in foreign countries. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 689/7** **PC A02/MF A01**  
 Department of Commerce, Washington, DC.



## Plant Requirements for Manufacture of Unfermented Grape Juice

Apr 56, 12p

Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div.

Descriptors: \*Industrial plants, \*Food processing, \*Manufacturing, \*Beverages, Grapes, Pasteurizing, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Industrial management, Production planning, Cost estimates, Labor estimates, Sanitation. Identifiers: Developing country application.

The report outlines the type of plant required for processing of fifteen tons of unfermented grape juice per day. Pressing juice out of grapes and processing the liquid into marketable grape juice requires, (a) the most careful selection of equipment which can be operated economically for fifteen tons of grapes per day, (b) maintaining the proper temperatures necessary for successful pasteurization, and (c) adhering strictly to established standards of cleanliness and sanitation. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 711/9

PC A03/MF A01

United States Testing Co., Inc., Hoboken, NJ.

## Plant Requirements for Manufacture of Antibiotics

Aug 62, 47p

Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div.

Descriptors: \*Antibiotics, \*Manufacturing, Requirements, Penicillins, Streptomycins, Tetracyclines, Equipment, Specifications. Identifiers: \*Pharmaceutical industry, Developing country application.

The report presents the establishment of a typical pharmaceutical plant, staffed and equipped to manufacture the antibiotics penicillin, streptomycin and tetracycline. Due to the nature of the products, parameters, and manufacturing processes, the operation is, of necessity, a large one. The brochure is one of a series of reports resulting from overseas technical inquiries on factory or commercial establishments, operation, management and engineering.

PB-292 718/4

PC A03/MF A01

Council for International Progress in Management (USA), Inc., New York.

## Problems in Business Management: Incentive Plans

Jun 62, 47p ICA-TB-31

Descriptors: \*Bonuses, \*Incentive contracts, Personnel management, Incentives, Fringe benefits, Productivity, Efficiency, Industrial relations, Job analysis, Work time standards, Work measurement, Salary administration. Identifiers: \*Blue collar occupations, Business administration, Developing country application.

The brochure is one of a series of training courses in 'Problems in Business Management'. It outlines information on establishing incentive plans for factory workers and discusses bonus systems for output quantity and work economy.

PB-292 719/2

PC A04/MF A01

International Cooperation Administration, Washington, DC. Office of Industrial Resources.

## Effective Job Organization

Apr 61, 64p Rept no. TB-23

Descriptors: \*Management training, \*Personnel development, \*Organization theory, Industrial management, Executives, Planning, Decision

making, Efficiency, Job analysis, Manuals, Scheduling, Supervision, Job utilization.

Identifiers: \*Administrative principles, Administrator responsibility, Skill development, Job enrichment, Organizational effectiveness, Developing country application.

The report explores in detail the executive's responsibility for clarifying jobs, for delegating, for planning, for decision-making, and for generally improving habits of personal efficiency. It probes deeply into the techniques and principles of executive and administrative action. It is designed for managers with some years of experience who can discuss the practical problems of organization that will help to improve their own skills and help their subordinates to perform more effectively.

PB-292 720/0

PC A03/MF A01

International Cooperation Administration, Washington, DC. Technical Aids Branch.

## Industrial Training Charts

Mar 61, 39p Rept no. TRAINING MANUAL-37

Descriptors: \*Management training, \*Industrial training, \*Manuals, \*Charts, Personnel development, Supervision, Job utilization, Job analysis, Planning, Decision making, Scheduling, Industrial relations, Meetings, Leadership. Identifiers: \*Supervisory methods, Developing country application.

The pamphlet contains a collection of charts for use in Management and Supervisory Training programs. The charts are directly applicable to supervisory training manuals, particularly the following: Conference Leadership, Job Instruction Training, Job Methods Training, Job Relations Training.

PB-292 721/8

PC A05/MF A01

International Cooperation Administration, Washington, DC. Office of Industrial Resources.

## Training Course in Material Handling

Mar 61, 91p Rept no. TECHNICAL BULL-11

Descriptors: \*Specialized training, \*Materials handling, Industrial training, Supervisors, Developing countries, Guidelines, Attitudes, Motivation, Elevators(Lift), Conveyors, Fork trucks, Hoists, Pallets, Cranes(Hoists), Chutes, Efficiency, Work elements, Work measurement, Elevators(Lifts). Identifiers: Developing country application.

Training in Material Handling is a course which points out the many opportunities that are presented for increasing production, lowering costs and increasing wages through application of modern methods in material handling. The objective of the course is to demonstrate that through the application of sound practice or a well-conceived system materials can be transported from and to storage and through all production stages with a minimum of transfer and handling. Efficiencies in both handling and in total movement of materials avoids production delays, reduces congestion, prevents loss of operation or time, minimizes utilization of machinery and equipment and expedites routing and shipping. Industry spends enormous sums of money for research and development directed towards many types of improvement, such as design engineering, cost engineering, safety engineering and others, but one of the greatest opportunities for reducing manufacturing cost and materially increasing man-hour production is frequently neglected. The aim of this course is assist supervisors to eliminate obvious and unnecessary movements in the handling and transporting of commodities and materials.

PB-292 730/9

PC A04/MF A01

Armstrong Cork Co., Lancaster, PA.

## Industrial First Aid Training

7 Jan 52, 51p ICA-TB-19

Descriptors: \*Industrial medicine, \*First aid, Manuals, Injuries, Patients, Transportation, Therapy, Dressings, Resuscitation. Identifiers: Illnesses, Health manpower education, Health education, Developing country application, \*Occupational health and safety.

The first aid training manual has been written to help teach supervisors and other personnel the

basic principles and practices necessary for the temporary care of injured or ill employees. In turn, their application of these principles will reflect the thoroughness of the teaching.

PB-292 731/7

PC A03/MF A01

International Cooperation Administration, Washington, DC. Office of Industrial Resources.

## Supervisory Development Program

1961, 26p Rept no. TECHNICAL BULL-6

Descriptors: \*Management training, \*Supervision, \*Manuals, Methods, Objectives, Personnel development, Management analysis, Industrial relations, Supervisors, Education. Identifiers: \*Training, Developing country application, Management education.

The manual is one of a series of training manuals for use in establishing supervisory training programs. It covers the philosophy of training, the need for training, general concepts, general objectives, scope of the program and the training plan.

PB-292 744/0

PC A05/MF A01

Armstrong Cork Co., Lancaster, PA.

## Plant Fire Brigade Training

May 62, 78p ICA-TB-18

Descriptors: \*Fire fighting, \*Specialized training, Industrial plants, Organizing, Personnel selection, Instructional materials, Manuals. Identifiers: Developing country application.

This training manual gives the purpose, organization and responsibilities of a Plant Fire Brigade, what is fire, how fire burns, plant fire protection - chemical extinguishers, field demonstration - chemical extinguishers, plant fire protection - water equipment, inspection - built in protection and brigade equipment, fighting a simulated fire and general safety precautions in fighting plant fires.

PB-292 745/7

PC A10/MF A01

International Science and Technology Inst., Inc., Washington, DC.

## Potential Use of Small Dams to Produce Power for Low-Income Communities

Mary M. Allen. 4 Aug 78, 220p

Contract CSA-B8B-5584

Prepared in cooperation with Polytechnic Inst. of New York, Brooklyn. Center for Regional Technology.

Descriptors: \*Hydroelectric power generation, \*Dams, Electric power generation, Low income groups, Communities, Regional planning, Environmental impacts, Safety, Economic analysis, Constraints. Identifiers: Developing country application.

An alternative source of energy which would have a stable cost and alleviate the economic strain of rising fossil fuels is the development of small dam sites to produce hydroelectric power. This report addresses the many issues involved in estimating the potential contribution of hydropower to the energy supply. The issues discussed include: (1) physical characteristics, (2) environmental and safety considerations, (3) institutional constraints, (4) economic issues, and (5) current governmental programs.

PB-292 746/5

PC A03/MF A01

Department of Agriculture, Washington, DC.

## Construcciones Resistentes Al Fuego - En El Hogar - Y En La Granja (Fire Construction of the Home--- of Farm Buildings)

Merril S. Himmins, Jr. 1968, 31p Rept no. USDA/ BULL-2227

Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Residential buildings, \*Farm buildings, \*Fire safety, Flameproofing, Barriers, Construction, Fire resistant materials, Fire protection. Identifiers: \*Developing country application, \*Fire barriers.

In order that the farm be as safe from fires as possible, the distance between the home, barn, silo



and other out buildings is specifically outlined along with the construction design for additional fire barriers. Fire barriers for the home have been designed for the basement, walls and stairs utilizing wooden blocks placed in strategic areas. Correct chimney construction, radio and television antenna installation and other areas sensitive to fire in the area of the roof are discussed. Also covered in this report is the installation and fireproofing of gas and oil furnaces, floor registers, wood burning stoves, lightning rods and electrical wiring. Because of the number of fires caused by spontaneous combustion and unsafe drying and/or heating methods in the stable, tobacco barn, grain elevator, poultry house and workshops, their proximity to equipment and other farm buildings and their fire barriers are outlined.

**PB-292 747/3** PC A07/MF A01  
Texas Transportation Inst., College Station.  
**Manual Para La Construcción de Casas de Tierra (Handbook for Building Homes of Earth)**  
Lile A. Wolfskill, Wayne A. Dunlap, and Bob M. Gallaway. 1966, 143p Rept no. BULL-21-E-14-63

Descriptors: \*Houses, \*Construction materials, \*Soils, Soil stabilization, Foundations, Soil compacting, Blocks, Weatherproofing, Coating processes, Manufacturing, Manuals.  
Identifiers: Developing country application, Earth construction.

Contents: Introduction - Types of earth houses; Soils and what can be done with them; Soil stabilizers; Site preparation; Foundations; Lightweight roofs; Getting the soil prepared; Making abode blocks; Making pressed earth blocks; Making walls of pressed blocks; Making walls of rammed earth; Roofs for earth houses; Floors for earth houses; Surface coatings.

**PB-292 754/9** PC A03/MF A01  
Armstrong Cork Co., Lancaster, PA.  
**Selection and Training of New Foremen**  
3 Feb 54, 47p ICA-TB-15

Descriptors: \*Personnel selection, \*Supervisors, Production management, Industrial training, Leadership, Supervision, Performance evaluation, Experience, Interviews, Intelligence tests, Attitudes, Industrial plants, Qualifications, Management training.  
Identifiers: \*Supervisor qualifications, Supervisory training, Developing country application.

The manual is one of a series of training manuals. Its purpose is to assist line management in identifying the best qualified hourly workers and feeding them into shift foremanship openings as they occur. The plan combines a proven comprehensive selection procedure with an intensive period of training for those selected. Its net result is an increase in the certainty that foremen picked from the hourly production group are--within the limits of those available--those individuals with the greatest capabilities and potential.

**PB-292 766/3** PC A02/MF A01  
Department of Agriculture, Washington, DC.  
**Ganado Bovino Para Carne - Descorne, Castracion, Marcacion a Hierro, Marcas (Beef Cattle - Dehorning, Castrating, Branding and Marking)**  
R. T. Clark, A. L. Baker, and George E. Whitmore. 1968, 20p Rept no. USDA/BULL-2141

Descriptors: \*Cattle, \*Marking, \*Castration, Livestock, Methodology.  
Identifiers: Developing country application, Dehorn.

Complete and detailed instructions of several different methods used to dehorn, castrate, brand and mark cattle are discussed in full. Dehorning--The age of the cow is an important factor and will determine if the Caustic Soda method is applied (just a few days old); or if the Spoon or Tube method is used (less than 60 days old). Any cow older than this is dehorned using the electric dehorning iron, gougers, or electric dehorning saw. Castration--Three surgical methods are explained along with two non-surgical methods; Clamping or Pinching which uses the Emasculator; or the Elastrator which uses hard rubber bands. The neu-

tering of cows is also discussed. Branding and Marking--Branding by heat and iron or liquid chemical is given full explanation as is further markings by nitching ears and tattooing.

**PB-292 767/1** PC A08/MF A01  
Department of Agriculture Extension Service, Washington, DC.  
**Homemaking Around the World**  
Nov 73, 167p

Descriptors: Food preparation, Nutrition, Health, Sanitation, Houses, Clothing, Children, Developing countries.  
Identifiers: \*Home economics, Child care, Developing country application.

The publication shows ways in which the basic principles of sound home economics may be applied in every home the world over to make living more satisfying. The information represents the pioneering experience of trained people in many countries. Topics covered include child care, foods and nutrition, health and sanitation, housing and home improvement, and care and construction of clothing.

**PB-292 769/7** PC A02/MF A01  
Gidley Research Inst., Fairhaven, MA.  
**Plant Requirements for Manufacture of Rubber Soling**  
Sep 56, 23p  
Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div.

Descriptors: \*Industrial plants, \*Manufacturing, \*Elastomers, \*Footwear, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application, \*Soles.

Rubber soles for footwear are fabricated and combined with shoe uppers by three general methods. The first method is the forming of a patterned, uncured sole and cementing it on a fabric upper section and then curing the entire assembly on a last (as in a vulcanizer or autoclave). This is the conventional method long used in making tennis shoes. The second method is to join a slab (without pattern) of rubber compound directly to a fabric or leather upper section in an automatic heated mold under pressure. This method employs a special machine--typical of which (though varying in design and merits) are the Goliath, Pinto, Bata, Marvel and Desmer machines. The method described in the report is to separately fabricate and cure (with or without a pattern) the soling itself. The cured or vulcanized soling is then attached to a fabric or leather upper by cementing, sewing or nailing--or combinations of these methods. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 784/6** PC A04/MF A01  
Wolf Management Engineering Co., Chicago, IL.  
**Sash and Door Plant; A Reference for use in Planning New Industrial Facilities**  
Feb 57, 68p  
Sponsored in part by International Cooperation Administration, Washington, DC. Office of Industrial Resources.

Descriptors: \*Industrial plants, \*Manufacturing, \*Wood products, Requirements, Production management, Production methods, Production capacity, Operating costs, Lumber, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Windows, Doors, Stairways, Moldings, Woodworking.  
Identifiers: Developing country application.

The purpose of the report is to present basic information for establishing and operating a small plant to be located in a foreign country to engage in fabrication of certain wood products from lumber which has been seasoned and surfaced. Because of the many types of wood products which are manufactured, this report is restricted to the operation of a Sash and Door Plant, as it is usually termed, which makes not only windows and doors, but other items of exterior and interior trim, such as moldings, stairways, and the cabinet work which is generally used in residences, schools, churches, hospitals, offices and stores. The information includes a general description of the usual steps in the manufacturing processes, with notes on materials, machinery, layout, and accounting procedures.

**PB-292 785/3** PC A03/MF A01  
Holman (John F.) Co., Inc., Washington, DC.  
**Plant Requirements for Manufacture of Bicycle Tires and Tubes**  
Jan 62, 32p  
Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div.

Descriptors: \*Industrial plants, \*Manufacturing, \*Tires, \*Tire tubes, Bicycles, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application.

The manufacturing plant described in this brochure is designed to produce bicycle tires made of natural rubber at the rate of approximately 500,000 per year. The tires considered here are of the pneumatic type that require an inner tube. This plant is assumed to produce natural rubber tubes at the same rate as the outer casings. Tire size is assumed to be either 26-inch or 28-inch diameter to fit an adult size bicycle. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 786/1** PC A03/MF A01  
Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements for Manufacture of Centrifugal Cast Iron Pipe**  
Feb 62, 36p  
Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div.

Descriptors: \*Industrial plants, \*Manufacturing, \*Cast iron, \*Pipes (Tubes), Centrifugal casting, Requirements, Production management, Production methods, Production capacity, Operating costs, Iron, Scrap, Pig iron, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application.

The purpose of the report is to present basic information for establishing and operating a small plant to produce centrifugal cast iron pressure pipe in a foreign country. Plants producing centrifugal cast iron pressure pipe in the United States are usually designed for a much larger volume of production. However, the processing methods and equipment described in this report are modern and conform to those now being used in the United States. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is de-



signed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 790/3** **PC A07/MF A01**  
Overseas Development Council, Washington, DC.  
**Energy for the Villages of Africa. Recommendations for African Governments and Outside Donors**

James W. Howe. 25 Feb 77, 146p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Africa, \*Developing countries, Rural areas, Communities, Solar energy, Biomass, Hydroelectric power generation, Agricultural wastes, Wood, Reviewing, Recommendations.  
Identifiers: \*Energy sources, \*Energy requirements, Developing country application, Wind power, Energy source development.

This report examines the subject of energy for the villages and farms of Africa and recommends a course of action for African policy makers and outside donors. Village source energy includes those forms of primary energy found in the villages and farms such as the sun, wind, water, animal and crop waste, and wood. The report outlines a course of action for developing the information needed for Africans to make two decisions: (1) whether village-source energy warrants use on a wide scale and if so, (2) what system to use to match energy hardware with village needs and to install it in villages together with a support system that will maintain it, provide repairs and spare parts, and generally keep it operating.

**PB-292 799/4** **PC A03/MF A01**  
International Cooperation Administration, Washington, DC. Technical Aids Branch.  
**Using Job Instruction Training**  
1962, 46p Rept no. TECHNICAL BULL-8

Descriptors: \*Management training, \*Supervisors, Personnel developments, Supervision, Job analysis, Instructions, Scheduling, Human factors engineering, Leadership, Production control, Personnel management.  
Identifiers: \*Training techniques, On job training, Developing country application.

The bulletin is a plan to make job instruction training a regular part of a plant's day-to-day operation. This 10-hour session outline is a follow through program to coach supervisors in normal operating functions. Getting supervisors to use this practical plan will accomplish a far-reaching purpose, as it makes the development of a well-trained work force a function of the line operation.

**PB-292 800/0** **PC A03/MF A01**  
Vitro Corp. of America, Washington, DC.  
**Plant Requirements for Manufacture of Galvanized Steel Pipe**  
Mar 62, 37p  
Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div. Prepared in cooperation with Morris and Van Wormer, New York.

Descriptors: \*Industrial plants, \*Manufacturing, \*Pipes(Tubes), \*Galvanized materials, Cold rolling, Resistance welding, Requirements, Production management, Production methods, Production capacity, Operating costs, Zinc, Steels, Metal strips, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Plugs, Bushings, Couplings, Water pipes, Gas pipes.  
Identifiers: Developing country application.

The purpose of the report is to present basic information relative to the establishment in a foreign country of a factory designed to produce certain sizes of galvanized steel pipe. This type of pipe is used for water, air, gas, oil, or other fluid lines, and for structural purposes such as fence posts, scaffolding, and railings. The proposed plant is about the minimum feasible size and will require a substantial capital investment and a small number of skilled workers. Profitable operation in industrially developing countries will depend upon the following factors: (1) the availability of steel strip and slab zinc (spelter) from nearby mills, or the presence of a sufficiently large domestic market, in the absence of a local supply of steel and zinc, sufficiently large to overcome the expense of imported materials; and (2) the availability of accessories such as galvanized couplings, nipples, elbows, unions, plugs, tees, guards, reducers, and bushings. Association with a facility producing the fittings would be advantageous for the pipe manufacturer. The report describes a plant manufacturing pipe threaded on both ends and not equipped with accessories. The pipe may be supplied unthreaded or it may be equipped with couplings or thread guards at an additional cost. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 801/8** **PC A05/MF A01**  
Mayer (Frank) Engineering Co., Los Angeles, CA.  
**Plant Requirements for Manufacture of Bottled Oxygen and Acetylene**  
Mar 62, 87p  
Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div.

Descriptors: \*Chemical industry, \*Industrial plants, \*Manufacturing, \*Oxygen, \*Acetylene, Requirements, Production management, Production methods, Production capacity, Operating costs, Process charting, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application.

The report outlines the basic processes, plant requirements and economic factors involved to establish a small plant in a foreign country for the production of oxygen and acetylene for commercial use. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 802/6** **PC A03/MF A01**  
Office of Technical Services, Washington, DC.  
**Plant Requirements for Manufacture of Standard Sport Stockings**  
Mar 62, 34p  
Prepared in cooperation with Agency for International Development, Washington, DC. Communications Resources Div.

Descriptors: \*Industrial plants, \*Manufacturing, \*Socks, Cotton spun yarns, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Knitting, Textile processes.  
Identifiers: Developing country application.

The purpose of the report is to present basic information for establishing and operating a small plant in a foreign country for the manufacture of men's stockings to be used by baseball and soccer players. Boy scouts sometimes wear these stockings. All stockings of this type are made by the knitting process. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

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**PB-292 803/4** **PC A03/MF A01**  
Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements to Set Up and Operate a Leather Tannery**  
May 59, 45p  
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Leather, Requirements, Production management, Production methods, Production capacity, Operating costs, Hides, Tanning materials, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application, \*Tanneries.

Most tanneries in the United States perform two functions, namely, processing the hide to pelts and tanning the pelts to the finished product, leather. Tanning of leather can be accomplished by any of the six well-known processes: vegetable, alum, chrome, oil, formaldehyde, and sulphur. The two most widely used today are the vegetable and the chrome. Due to the relatively large demand for upper shoe leather, this manual will be developed on processing hides from their raw state to finished upper leather by using the two-bath chrome tanning process. The most desirable upper leather is secured from light cattle hides which weigh approximately 54 pounds each. These hides are purchased by the pound, the average cost being \$0.13 per pound; the finished leather product is sold on the square footage basis at approximately \$0.35 per square foot, or \$0.298 per pound. The tannery herein proposed will be capable of processing 16,000 pounds of raw hides to yield 13,500 square feet of finished upper leather per eight-hour day, utilizing about 56 workers, and would be of minimum economic size. Annual cost of hides, 4,000,000 pounds, at \$0.13 per pound = \$520,000. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 812/5** **PC A03/MF A01**  
Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements for Manufacture of Concrete Posts**  
Oct 62, 38p  
Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div.

Descriptors: \*Industrial plants, \*Manufacturing, \*Concrete structures, \*Fences, Concrete products, Columns(Supports), Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application.

The purpose of the report is to present basic information for establishing a manufacturing plant, in a foreign country, to produce concrete fence posts.



## APPROPRIATE TECHNOLOGY ABSTRACTS

In addition to fence posts, the equipment listed in the report will produce posts of all kinds and shapes up to 16 inches by 16 inches in diameter as well as such products as window sills, door sills, coping, cornice, lintels, decorative blocks, screen blocks, lamp posts, fancy wall blocks, and porch columns. For the purpose of the report only concrete fence posts are considered. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 816/6** **PC A03/MF A01**  
Appropriate Technology Group, Oskaloosa, KS.  
**Wind Driven Water Pumps. Economics, Technology, Current Activities**  
Steve Blake. cDec 78, 29p\*  
Prepared for International Bank for Reconstruction and Development, Washington, DC.

Descriptors: \*Windmills, Pumping, Water, Cost analysis, Well pumps, Technology.  
Identifiers: Developing country application, Savonius rotors.

The illustrated handbook discusses the economics and the characteristics typical of the aermotor windmill and the indigenous windmill. Since the use of windmills can have worldwide impact upon the development and upgrading of water supplies, an emphasis is placed upon the importance of supplying this technical information to the developing countries of the world.

**PB-292 821/6** **PC A03/MF A01**  
Wolf Management Engineering Co., Chicago, IL.  
**Plant Requirements for Manufacture of Refrigerated Walk-In Coolers**  
Sep 57, 26  
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Coolers, Refrigerators, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application.

The subject of the report is the manufacture or fabrication of commercial or walk-in coolers. It is intended to present the data in a form that a potential plant operator would find useful to consider before entering the business of making walk-in coolers. Before undertaking the manufacture of walk-in coolers, the prospective investor is advised to have a complete administrative, operating and financial analysis made by a reputable firm of management engineers. The report is one of a series of reports resulting from overseas technical inquiries on factory establishments, operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type.

**PB-292 822/4** **PC A03/MF A01**  
Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements for Manufacture of Dehydrated Molasses**  
Sep 61, 33p  
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Molasses, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management,

Industrial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application.

The purpose of the report is to present basic information for establishing a by-product plant to produce dehydrated molasses from blackstrap molasses. Blackstrap molasses is a by-product of the sugar refining industry. The molasses has a high food value and can be used advantageously as a diet supplement in animal feeding. The equipment should be installed by a sugar refining company at its refinery in order to eliminate freight and storage costs of the blackstrap molasses which would occur if the plant were located elsewhere. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 823/2** **PC A03/MF A01**  
Wolf Management Engineering Co., Chicago, IL.  
**Plant Requirements for Manufacture of Manganese**  
May 57, 37p  
Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div.

Descriptors: \*Industrial plants, \*Manufacturing, \*Manganese, Requirements, Production management, Production methods, Production capacity, Operating costs, Metalliferous minerals, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application.

The report is concerned primarily with the processing of the mineral-bearing ore into material for use as a reagent in steel making (its principal use) and as an ingredient in special alloy steels, with limited mention of its secondary use in the chemical industry and battery manufacturing. These, in reality, are the three principal uses. The report presents the electrolytic process as one of the acceptable types of processes designed to give satisfactory production with reasonable assurance of a successful operation. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 824/0** **PC A03/MF A01**  
Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements to Set Up and Operate a Gray Iron Jobbing Foundry**  
May 59, 40p  
Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div.

Descriptors: \*Industrial plants, \*Gray iron, \*Foundries, Cast iron, Requirements, Molding techniques, Pattern making, Operating costs, Materials estimates, Equipment, Plant layout, Industrial management, Financial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application.

Because of the variety of metals used and the limitless number of items that are cast, it is difficult, if not impossible, to make generalized statements regarding cost of production and equipment requirements that are comprehensively accurate. Because iron castings are most widely used, the discussion concerns itself with what is known as gray iron castings. A further complication arises in that foundries are of two general types--production

and jobbing. Production foundries may be departments of large establishments engaged in the mass production of items, of which the casting is only one step in the entire process of manufacture and assembly; or they may be independent foundries making many identical castings where work is repetitive and the foundry process is highly mechanized in order to secure minimum costs. Not only is much of the work done on machines, but the handling of materials is almost completely conveyorized. The job foundry, on the other hand, stands ready to produce for any customer who comes along, provided the foundry has facilities suitable to make the castings required. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 825/7** **PC A02/MF A01**  
Office of Technical Services, Washington, DC.  
**Plant Requirements for Manufacture of Metal Spinning Products**  
Apr 56, 11p  
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Metal shapes, \*Spinning(Extruding), Metal extruding, Requirements, Production management, Production methods, Production capacity, Operating costs, Bronzes, Steels, Aluminum, Copper, Materials estimates, Equipment, Plant layout, Machinery, Tools, Industrial management, Production planning, Cost estimates, Labor estimates, Metal working.  
Identifiers: Developing country application.

The report outlines the type of plant required for the manufacture of metal shapes formed by means of spinning and its advantages. Metal spinning is a skillful art of folding a flat piece of pliable thin sheet metal over the contours of a pattern. Folding is done by applying a specific spinning tool either by hand or by mechanical means to the fast-rotating sheet metal. The metal may be ferrous or non-ferrous. The tool can be simple or complicated, depending on the shape of the chuck. Present-day spinning techniques permit many ways of fashioning sheet metal shapes, and is favored by metal working shops in many cases. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. Plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 826/5** **PC A03/MF A01**  
Vitro Engineering Co., Washington, DC.  
**Plant Requirements for Manufacture of Block Ice**  
Mar 62, 31p  
Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div.

Descriptors: \*Industrial plants, \*Manufacturing, \*Ice, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application.

The purpose of the report is to present basic information for establishing a manufacturing plant in a foreign country to produce block ice. All information and figures contained are based on the production of clear, pure ice in block form. Water is



the only raw material used in the manufacturing process. The report is based on the production of ice made with water obtained from an approved municipal supply system. Prior to manufacture, the water must be subjected to a softening process to remove dissolved mineral compounds such as calcium, magnesium, and iron. If the water is obtained from natural sources such as wells, rivers, or lakes, it must be treated to remove impurities of a bacterial nature in addition to the softening process. The plant is designed to produce 10 tons of ice per day or 3,650 tons per year in 300 pound blocks. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 827/3** **PC A03/MF A01**  
 Agency for International Development, Washington, DC. Communications Resources Div.  
**Plant Requirements for Manufacture of Abrasive Wheels**  
 May 59, 36p

Descriptors: \*Industrial plants, \*Manufacturing, \*Grinding wheels, Tools, Abrasives, Aluminum oxide, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
 Identifiers: Developing country application.

The report describes a plant to manufacture a general purpose wheel. The resinoid type of bond is used because of the comparatively simple process in manufacture. The type of abrasive is aluminum oxide--a common type. The equipment described can produce plain disk wheels ranging from 2 inches diameter x 1/4 inches thick to 8 inches diameter x 1 inch thick. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 828/1** **PC A03/MF A01**  
 Vitro Engineering Co., Washington, DC.  
**Plant Requirements for Manufacture of Stainless Steel Utensils**  
 Mar 62, 36p  
 Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div.

Descriptors: \*Industrial plants, \*Manufacturing, \*Stainless steels, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
 Identifiers: Developing country application, \*Utensils.

The purpose of the report is to present basic information for establishing a small factory to manufacture stainless steel utensils in a foreign country. Stainless steel, a corrosion and heat resistant alloy, is very suitable for the fabrication of utensils to be used in restaurants, hospitals, military institutions, industries, or homes. Small utensils of this type, up to 5 inches in diameter, are usually pressed or drawn on a light hydraulic press; while those over 6 inches in diameter are spun on a lathe. They may be produced in a variety of types

and sizes such as shallow or deep bowls, cups, pans, and pots; and narrow or wide-necked jugs or cylinders. It is suggested that only simple shapes be processed at first to suit the local needs. Later, the types of items can be widely diversified, and the production rate increased to comply with an expanding domestic market. The plant proposed herein is about the minimum feasible size. It will require a modest capital investment in machinery and tools, and a small labor force of skilled metal workers. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 829/9** **PC A03/MF A01**  
 Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements for Manufacture of Coarse Wrapping Paper**  
 May 59, 36p  
 Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Kraft paper, Paper mills, Requirements, Production management, Production methods, Production capacity, Operating costs, Wood pulp, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Papermaking.  
 Identifiers: Developing country application.

The purpose of the manual is to present basic information for establishing and operating a small coarse wrapping paper mill in a foreign country. The plant is designed to produce one-ton of coarse wrapping paper per hour. The plant may be operated as many hours per day as desired, since no difficulties are presented in closing down and starting up the operations. Only about 15 minutes preparation is required to start production and only about five minutes preparation is required to stop production. Based on current practice, in the United States, this is a small plant. The recommended equipment and production methods are modern and have proven profitable when operated under conditions comparable to those assumed. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 830/7** **PC A03/MF A01**  
 Vitro Engineering Co., Washington, DC.  
**Plant Requirements for Manufacture of Copper Tubing**  
 Mar 62, 34p  
 Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div.

Descriptors: \*Industrial plants, \*Manufacturing, \*Copper, \*Metal tubing, Extrusions, Requirements, Production management, Production methods, Production capacity, Operating costs, Copper, Ingots, Materials estimates, Equipment, Plant layout, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Extruders, Presses, Metallurgical furnaces.  
 Identifiers: Developing country application.

The purpose of the report is to present basic information relative to the establishment of a small copper tubing plant in a foreign country. This plant is designed to produce seamless, thin-walled, flexible, copper tubing by the extrusion method only. This tubing is generally used with solder type fittings, requiring no threads, and comes in two types: K (heavy duty), and L (light duty), the only difference being the wall thickness. The report is based on the manufacture of type K only, which is suitable for general plumbing and heating purposes, underground usage, and for gas, steam, and oil lines. This plant, which is about the minimum feasible size, will require a substantial capital investment; however, it can be operated by a relatively small number of skilled workers. Profitable operation in industrially developing countries will depend upon two main factors: (1) the availability of locally mined and refined copper to provide low cost ingots thus enabling the plant to export its products; and (2) the presence of a sufficiently large domestic market, in the absence of domestic copper, to overcome the expense of imported ingots. Association of this tubing plant with a copper wire drawing facility would result in considerable savings and increased profits since the tubing extruder could produce the 5/16 inch copper rod required by the wire plant. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 831/5** **PC A03/MF A01**  
 Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements for Manufacture of Chrome Tanned Leather**  
 Sep 61, 40p  
 Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Leather, Requirements, Production management, Production methods, Production capacity, Operating costs, Hides, Tanning materials, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
 Identifiers: Developing country application, \*Tanneries.

The purpose of the report is to present basic information for establishing a small leather tanning plant in a foreign country. The product produced in this plant is a good grade of chrome tanned leather, the annual capacity being 185,000 square feet. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 854/7** **PC A16/MF A01**  
 Hosken (Franziska P.), Lexington, MA.  
**International Directory of Women's Development Organizations**  
 Franziska P. Hosken. 1977, 362p\*  
 Contract AID/ta-C-1176

Descriptors: \*Organizations, \*Females, \*Directories, Professional personnel, Personnel development, Social organizations, Personnel, Communicating, Foreign countries, United States.  
 Identifiers: Developing country application.



Women's organizations represent a huge resource and an enormous quantity of talent which all too often are only partially used by society. The purpose of this Directory is to provide the basic contacts for communication among women's organizations, resource groups, and the international development community. It is a useful compilation of women's professional, business, and social groups worldwide. This Directory will serve as a useful reference tool for all those desiring to expand their contacts and perspectives for involving more women in the development process.

**PB-292 856/2** **PC A12/MF A01**  
**ACTION/Peace Corps, Washington, DC.**  
**Teaching Conservation in Developing Nations**  
 Judith Brace, Ralph R. White, and Stephen C. Bass. 1977, 262p  
 Sponsored in part by National Audubon Society, New York, and Agency for International Development, Washington, DC. Report on Appropriate Technologies for Development Series, Number Seven.

Descriptors: \*Conservation, \*Natural resources, \*Education, \*Developing countries, Instructional materials, Manuals, Project planning, Buildings, Concepts, Soil conservation, Ecology, Landscaping, Erosion, Food chains, Animals, Plants(Botany), Training devices, Visual aids.  
 Identifiers: Developing country application.

The goal of conservation education is to lead the public through a series of steps about nature, land, and natural resources which include: awareness, understanding, respect, responsibility, and action. This manual provides ideas, activities, and resources for incorporating conservation education into day-to-day community activities. It is structured around a local center which can be used to present an on-going conservation education program by means of pictures and posters, exhibits and collections, films and discussions.

**PB-292 857/0** **PC A11/MF A01**  
**ACTION/Peace Corps, Washington, DC.**  
**Reforestation in Arid Lands**  
 Program and training journal manual series  
 Fred R. Weber, Frederick J. Holman, and Virginia C. Palmer. c1977, 244p Rept no. MANUAL SER-5  
 Report on Appropriate Technologies for Development Series, Number Three. Sponsored in part by Agency for International Development, Washington, DC. Also pub. as VITA Publications manual series no. 37E.

Descriptors: \*Reforestation, \*West Africa, \*Developing countries, Arid land, Manuals, Conservation, Planting, Soil properties, Water supply, Planning, Site surveys, Plant reproduction, Seeds, Cultivation, Forest trees, Identifying, Forest fires, Fire prevention, Climate, Financing.  
 Identifiers: Developing country application.

Reforestation efforts are begun for the important reasons of conserving and protecting, and to increase production of forestry resources. Reforestation projects have been of great importance over the past few years in Africa. This manual is an attempt to present some current examples of forestry programs in West Africa. It is based upon the collective experiences of foresters and of local farmers and herders. Many of the problems of reforestation of dry areas are the same worldwide. Presented in the manual are methods and planning guides which can be of great benefit in the arid areas of the world.

**PB-292 860/4** **PC A04/MF A01**  
 Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements for Manufacture of Farm Hand Tools**  
 May 59, 51p  
 Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Tools, Requirements, Production management, Production methods, Production capacity, Operating costs, Forging, Materials estimates, Equip-

ment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Power equipment, Hammers, Rakes, Forks.  
 Identifiers: Developing country application.

The manual covers tools for the farm that are used through the application of human effort. It does not encompass farm implements that are operated through animal or mechanical energy. The primary process used in the production of these farm hand tools in the plant discussed is forging. Because the volume of production covered by this manual will not be sufficient to justify costly drop forging equipment and its accompanying expensive dies, the process of hammer forging by power hammers is proposed. This process is essentially the art of blacksmithing. In addition some of the skill required by the blacksmith to form properly the article he is forging is transferred to the dies used in the power hammers. These dies have simple contours in them that tend to produce the desired shape automatically. Nevertheless, a fairly high degree of skill is required on the part of the hammerman who operates a power hammer. In addition to power hammers, a mechanical forging press is also required to obtain uniformity in the shape of certain tools and to produce shapes that would otherwise be very difficult to obtain. The other operations and pieces of equipment needed in the proposed plant are also discussed. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 861/2** **PC A03/MF A01**  
 Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements for Manufacture of Sheet Glass**  
 May 59, 35p  
 Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Sheet glass, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
 Identifiers: Developing country application.

The small glass plant described in the report is intended to manufacture sheet glass in a foreign country. It is considered to be the smallest size modern sheet glass plant that can be economically operated. The plant is designed to use the Fourcault process for the production of window glass. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 863/8** **PC A03/MF A01**  
 Economic Research Service, Washington, DC. Development and Trade Analysis Div.  
**How the United States Improved Its Agriculture**  
 Raymond P. Christensen, William E. Hendrix, and Robert D. Stevens. Mar 64, 39p Rept no. ERS/FOREIGN-76  
 Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Agricultural economics, \*United States, Production, Investments, Natural resources, Education, Management, Output, Employment, Capital, Manpower, Income.  
 Identifiers: Developing country application.

This publication is a concise but comprehensive study listing numerous interrelated factors which have contributed to the large output and high productivity of American agriculture. They include: (1) A large supply of land and water resources; (2) large investments for education that improve human skills and managerial abilities; (3) development and diffusion of new knowledge about agricultural technology; (4) complementary industrial development that supplies capital inputs for agriculture and nonfarm employment opportunities for people not needed in agriculture; (5) a structural organization of farm production and marketing that provides powerful economic incentives for farmers and marketing firms to increase output and productivity; and (6) public and private institutional services that (a) help conserve and improve natural resources, (b) increase the fund of knowledge about improved agricultural technology, (c) encourage capital formation and investments in agriculture, and (d) assure farm people that they will share in the economic benefits of increased production.

**PB-292 864/6** **PC A03/MF A01**  
 Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements for Manufacture of Sulfuric Acid**  
 Oct 61, 31p  
 Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Chemical industry, \*Industrial plants, \*Manufacturing, \*Sulfuric acid, Requirements, Production management, Production methods, Production capacity, Operating costs, Process charting, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
 Identifiers: Developing country application.

The purpose of the report is to present basic information for establishing a plant in a foreign country to produce sulfuric acid. Sulfuric acid is one of the most important materials upon which our industrial society depends. The following is a partial list of the industries which are its consumers: agriculture, chemical, petroleum, coal products, iron and steel, paints and pigments, rayon and cellulose film. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 865/3** **PC A04/MF A01**  
 Maynard (H. B.) and Co., Inc., Pittsburgh, PA.  
 Methods Engineering Council Div.  
**Plant Requirements for Manufacture of Laundry and Milled Toilet Soap**  
 May 57, 71p  
 Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Soaps, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
 Identifiers: Developing country application.

The report outlines the type of plant required for the manufacture of laundry and milled toilet soap. Two plans are specified one with a capacity of



three tons per day, and the other with a capacity of three tons per week. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 869/5** **PC A03/MF A01**  
 Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements to Set Up and Operate a Small Steel Melting Plant**  
 Sep 57, 33p  
 Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Steel plants, \*Melting furnaces, \*Manufacturing, \*Ingots, Requirements, Production management, Production methods, Production capacity, Operating costs, Metal scrap, Materials estimates, Equipment, Plant layout, Industrial management, Production planning, Cost estimates, Labor estimates, Cast products(For reworking).  
 Identifiers: Developing country application, Steel 1010, Steel 1020.

The small steel melting plant described in the report is intended to manufacture ingots or billets from scrap metal where the demand for such products exists and where such a local operation would be practicable. The product of this plant is intended for use in a small steel rolling mill to produce concrete reinforcing bars and merchant shapes. Either ingots or billets can be produced in the plant. However, for the purpose of simplification, only ingots are discussed in the report. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 871/1** **PC A04/MF A01**  
 Ghana Academy of Sciences, Accra.  
**Better Vegetables, Ghana Handbook**  
 Daniel A. Sekyere, and Sandy J. McCorvey. Jul 67, 54p  
 Sponsored in part by Agency for International Development, Washington, DC. and Agency for International Development, Accra (Ghana).

Descriptors: \*Tropical regions, \*Vegetable plants, \*Horticulture, \*Ghana, \*Developing countries, Cultivation, Hand tools, Soil properties, Water supply, Planting, Mulches, Sterilization, Protection, Seeds, Fertilizers, Plant diseases, Pest control, Manuals, Africa.  
 Identifiers: Developing country application.

This bulletin is to stimulate interest in increased vegetable production and to assist prospective gardeners toward growing a quality product for market. Much practical information is given on all facets of vegetable growing: preparing the site, transplanting, the culture of vegetables, specific local vegetables, and soil sterilization. This handbook is based on the three major climatic zones found in Ghana and other countries on the West Coast of Africa. These zones may be identified as coastal, forest, and savannah.

**PB-292 872/9** **PC A06/MF A01**  
 Environmental Research Inst. of Michigan, Ann Arbor. Applications Div.  
**AID's Remote Sensing Grant Program**  
 Final rept. 20 Sep 74-30 Mar 78  
 Thomas W. Wagner, and Donald S. Lowe. Aug 78, 119p Rept no. ERIIM-111800-1-F  
 Contract AID/ta-C-1148

Descriptors: \*Remote sensing, \*Developing countries, Bangladesh, Bolivia, Chile, Lesotho, Pakistan, Peru, Philippines, Sri Lanka, Thailand, Zaire,

Grants, Land use, Agriculture, Mineral deposits, Geology, Snowfall, Drainages, Vegetation, Forestry, Image processing, Mapping, Technology transfer.  
 Identifiers: LANDSAT satellites, Developing country application.

This report describes the administration and results of a three-year small grant program to transfer remote sensing technology to ten developing countries. The program included: (1) awarding financial grants to investigators in developing countries, (2) providing technical assistance to those investigators, and (3) carrying out several special studies at AID's request. The ten countries that had grant projects selected on the basis of competitive proposals were Bangladesh, Bolivia, Chile, Lesotho, Pakistan, Peru, Philippines, Sri Lanka, Thailand, and Zaire.

**PB-292 874/5** **PC A03/MF A01**  
 International Cooperation Administration, Washington, DC. Office of Industrial Resources.  
**Economics Training**  
 Technical bulletin.  
 Oct 56, 34p Rept no. TB-22

Descriptors: \*Economics, \*Specialized training, Manuals, Objectives, Economic conditions, Prices, Supply(Economics), Demand(Economics), Salaries, Productivity, Value, Economic factors, Cost analysis, Government, Instructional materials, Education.  
 Identifiers: \*Training, Money systems, Expenditures, Developing country application.

The document describes an economic training program for employees which contains basic elements of economics in four sessions: (1) The system in which we live; (2) The cost of government; (3) Money and prices; and (4) Wages and productivity.

**PB-292 878/6** **PC A03/MF A01**  
 Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements for Manufacture of Two-Burner Gas Plates**  
 May 59, 31p  
 Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Gas appliances, \*Stoves, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
 Identifiers: Developing country application, Gas plates.

The report outlines the type of plant required for the manufacture of two-burner gas plates. These units fortunately require relatively inexpensive equipment so that the total capital required is quite modest. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 879/4** **PC A03/MF A01**  
 National Project in Agricultural Communications, East Lansing, MI.  
**Campaigns in Agricultural Extension Programs, Number 3**  
 John W. Spaven. 1960, 26p  
 Sponsored in part by International Cooperation Administration, Washington, DC. Office of Food and Agriculture.

Descriptors: \*Agriculture, \*Education, Project planning, Personnel development, Objectives,

Scheduling, Information services, Evaluation, Meetings, Methodology, Farm management, Instructional materials.  
 Identifiers: \*Agricultural extension services, Information dissemination, Training techniques, Developing country application.

The booklet is designed to help those who use campaigns in their educational and advisory programs. It lists the five steps in a campaign and the who, why, when, and how many of an educational campaign. This is one of a series of booklets designed to answer questions about agricultural communications.

**PB-292 881/0** **PC A03/MF A01**  
 Armstrong Cork Co., Lancaster, PA.  
**General Operating Rules for Power Boilers**  
 R. G. Wickat. 23 Mar 50, 32p ICA-TB-17  
 Sponsored in part by International Cooperation Administration, Washington, DC. Office of Industrial Resources.

Descriptors: \*Boilers, \*Instructions, Manuals.  
 Identifiers: Developing country application.

The manual is one of a series of training manuals. The suggested Rules 'Case of Power Boilers' promulgated by the American Society of Mechanical Engineers, the American Boiler Manufacturers Association, and various Political Sub-Division Authorities have been used as a guide in the preparation of these General Rules.

**PB-292 887/7** **PC A04/MF A01**  
 Loughborough Univ. of Technology (England). WEDC Group.  
**Indexed Bibliography of Publications on Water and Waste Engineering for Developing Countries**  
 John Pickford. Jun 77, 56p  
 Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Water supply, \*Sewage disposal, \*Solid waste disposal, \*Developing countries, \*Bibliographies, Ground water, Irrigation, Hydrology, Lagoons(Ponds), Water treatment, Rural areas, Water consumption, Tropical regions, Industrial wastes, Sewage treatment, Cost analysis, Pumping, Septic tanks.  
 Identifiers: Developing country application, Land application, Sewage irrigation.

This bibliography is primarily intended for those working in developing countries or preparing projects for developing countries. The term 'water engineering' includes water resources and hydrology with an emphasis on community water supply. 'Waste engineering' includes solid waste as well as wastewater. Included are some references to irrigation and environmental aspects of hydro-electric schemes. There are also a few entries dealing with environmental control such as air pollution and ventilation of buildings.

**PB-292 898/4** **PC A05/MF A01**  
 Academy for Educational Development, Washington, DC. Clearinghouse on Development Communication.  
**A Sourcebook on Radio's Role in Development**  
 Peter Spain, Judith Yarborough, and Emily Raskin. 1976, 91p Rept no. IB-7  
 Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Radio communication, \*Bibliographies, Research, Research projects, Management planning, Strategy, Technology innovation.  
 Identifiers: Developing country application.

A worldwide renaissance of interest in radio is underway. In this document the attempt has been made to supply as much information as possible on information sources. There are six hundred entries, the majority of which have been annotated, and some have been abstracted. The booklet is divided into three areas which include the type of document, issues, and strategies.

**PB-292 899/2** **PC A02/MF A01**  
 Sears, Roebuck and Co., Philadelphia, PA.



**Como Instalar un Sistema Domestico de Eliminacion de Aguas Negras. (How to Install Homart Domestic Sewage System - How to do it Yourself for Better Living)**  
1965, 15p

Descriptors: \*Sewage disposal, \*Septic tanks, \*Developing countries, Manuals, Diagrams, Construction materials, Installing, Pipes(Tubes), Pipe fittings, Climate, Planning, Site surveys, Area, Fluid infiltration.

Identifiers: Developing country application.

A complete, step by step set of instructions, plans, diagrams and bill of materials needed for the installation of the Homart Domestic Sewage System are discussed. Some of the topics discussed in the report are: Climate and location considerations; line elevation; dry well construction; guides to determine adequate area for waste absorption; and pipe fittings.

**PB-292 904/0** PC A04/MF A01  
Academy for Educational Development, Washington, DC. Clearinghouse on Development Communication.

**Tele-Niger: Adapting an Electronic Medium to a Rural African Context**  
Theresa Silverman. Oct 76, 53p Rept no. IB-8

Descriptors: \*Television systems, \*Education, \*Rural areas, \*Niger, Telecommunication, Government policies, Sociology, Technology assessment, Learning, Evaluation, Mass media, Problem solving, Developing countries.

Identifiers: \*Educational television, Developing country application, Instructional aids, Curriculum, Political socialization.

The report should have some relevance to current rural development projects applying a range of media to a range of problems. Some important lessons have been learned from Tele-Niger and are discussed in the report. They include a model for evaluation, positive results, and limitations.

**PB-292 908-SET** PC E11  
ACTION/Peace Corps, Washington, DC.  
**Small Farm Grain Storage**  
Sep 76, 547p-in 3v

No abstract available.

**PB-292 909/9** PC A10/MF A01  
ACTION/Peace Corps, Washington, DC.  
**Small Farm Grain Storage. Volume I. Preparing Grain for Storage**  
Program and training journal manual series  
Carl Lindblad, and Laurel Druben. Sep 76, 209p  
Rept no. MANUAL SER-2-VOL-1  
Sponsored in part by Agency for International Development, Washington, DC. Also pub. as VITA Publications manual series no. 35E.  
Also available in set of 3 reports PC E11, PB-292 908-SET.

Descriptors: \*Grains(Food), \*Farm storage, Developing countries, Manuals, Drying, Moisture content, Temperature, Insects, Rodents, Fungi, Cleaning, Design, Construction, Harvesting, Heating.  
Identifiers: Developing country application, Granaries, Appropriate technology.

This brochure discusses grain storage problems as they are faced by small-scale farmers. It contains explanations of the structure of grain, the relationship between grain and moisture, the need for proper drying. One large section contains detailed, fully illustrated plans for constructing a variety of small-scale grain dryers.

**PB-292 910/7** PC A09/MF A01  
ACTION/Peace Corps, Washington, DC.  
**Small Farm Grain Storage. Volume II. Enemies of Stored Grain**  
Program and training journal manual series  
Carl Lindblad, and Laurel Druben. Sep 76, 180p  
Rept no. MANUAL SER-2-VOL-2  
Also pub. as VITA Publications manual series no. 35E.  
Also available in set of 3 reports PC E11, PB-292 908.

Descriptors: \*Pest control, \*Grains(Food), \*Farm storage, Developing countries, Manuals, Insects, Rodents, Life cycles, Coleoptera, Lepidoptera, Malathion, Poisons, Traps, Insecticides, Dosage, Safety.

Identifiers: Developing country application, Appropriate technology.

This is an in-depth study of two major enemies: insects and rodents. Each is discussed in detail with guidelines for (1) defining the size of the problem and (2) protecting grain by both chemical and non-chemical means. This volume includes dose and use information for a variety of pesticides, as well as suggestions for preparing materials to be used in audio-visual presentations.

**PB-292 911/5** PC A08/MF A01  
ACTION/Peace Corps, Washington, DC.  
**Small Farm Grain Storage. Volume III. Storage Methods**

Program and training journal manual series  
Carl Lindblad, and Laurel Druben. Sep 76, 158p  
Rept no. MANUAL SER-2-VOL-3  
Sponsored in part by Agency for International Development, Washington, DC.  
Also available in set of 3 reports PC E11, PB-292 908-SET.

Descriptors: \*Grains(Food), \*Farm storage, Developing countries, Manuals, Baskets, Bins, Silos, Underground structures, Construction, Construction materials, Insecticides, Maintenance, Cleaning, Containers.

Identifiers: Developing country application, Granaries, Appropriate technology.

This brochure contains a survey of storage facilities from the most traditional basket-type granary to metal bins and cement silos. The emphasis in this volume is on improving existing facilities; for example, there are detailed construction procedures for an improved mud silo. Storage in underground pits and sacks also is discussed. There are guidelines for using insecticides in storage situations. The largest silo presented in detail is the 4.5 ton cement slave silo.

**PB-292 913/1** PC A02/MF A01  
Asian Inst. of Tech., Bangkok (Thailand).  
**Solar Rice Dryer**  
Robert H. B. Exell, and Sommai Kornsakoo. Oct 78, 9p  
Sponsored in part by John F. Kennedy Foundation of Thailand, Bangkok.

Descriptors: \*Solar heating, \*Rice, \*Drying apparatus, Solar energy, Descriptions, Technology innovation, Instructions, Photographs, Agricultural machinery, Crop driers.  
Identifiers: \*Solar rice dryers, Developing country application.

The paper briefly describes a low-cost solar heated rice dryer which is protected from the rain and can dry paddy in one or two days. Photographs and illustrations are used to help understand and implement the directions for constructing a solar rice dryer.

**PB-292 915/6** PC A05/MF A01  
Agency for International Development, Washington, DC. Office of Agriculture.  
**The Development of Hybrid Corn Technology in the United States and Selected Countries**  
Technical series bulletin  
G. F. Sprague. Mar 75, 91p Rept no. TSB-16

Descriptors: \*Hybridization, \*Corn plants, \*Plant genetics, History, Yield, Selection, Corn oil, Proteins, Insects, Vulnerability, Plant diseases, Marketing, Economic development, Seeds, United States, Europe, Kenya, Colombia, Brazil, Southeast Asia, India.

Identifiers: Developing country application.

The report presents the background and recent developments of the new high-yielding more nutritive corn types and explains their significance in food-short countries among malnourished populations. This new high lysine corn out-yields native corn types and has more than double the nutritive value of ordinary corn with protein quality essen-

tially equal to that of skim milk. Worldwide development and acceptance have been relatively rapid. Unlike ordinary corn, these new types are not deficient in two essential amino acids--lysine and tryptophan.

**PB-292 919/8** PC A03/MF A01  
Andrews (George H.) Engineering Associates, Inc., Washington, DC.

**Plant Requirements for Manufacture of Hooked Rugs**

Oct 61, 30p  
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Carpets, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application.

The purpose of the report is to present basic information for establishing a Hooked Rug plant in a foreign country. This industry is peculiarly adapted to locations where wage rates are low since only \$260 for machinery and equipment is required and only sixteen workers, direct and indirect, are used. It can be operated as a domestic, home, handicraft employing only the members of a family or as a small industry as shown in the report. The annual capacity of this plant is 1,200 rugs, 36 inches by 56 inches or 14 square feet in size. The annual sales value would remain about the same regardless of the size of the rugs, since smaller rugs would sell for proportionately more per square foot and larger rugs would sell for proportionately less per square foot. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 920/6** PC A03/MF A01  
Wolt Management Engineering Co., Chicago, IL.  
**Plant Requirements for Manufacture of Wire Products**  
Sep 57, 43p  
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Wire, Requirements, Production management, Production methods, Production capacity, Operating costs, Wire drawing, Materials estimates, Equipment, Machinery, Industrial management, Production planning, Cost estimates, Staples, Nails(Fasteners), Fences, Barbed wire.  
Identifiers: Developing country application.

The report concerns the cost and economic feasibility of establishing a wire products factory. It is one of a series resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions. The following topics are discussed: Machinery and equipment for producing wire; Estimated cost of machinery and equipment for producing wire; Machinery and equipment for producing fencing wire; Machinery and equipment for producing wire garment hangers; Machinery and equipment for producing fly screen; Machinery and equipment for producing nails and staples; Economics of a wire mill and fence making operation; and Technical assistance 'turn-key' operation.



**PB-292 921/4**

**PC A04/MF A01**

Andrews (George H.) Engineering Associates, Inc., Washington, DC.

**Plant Requirements for Manufacture of Radios**  
Sep 57, 63p

Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

**Descriptors:** \*Industrial plants, \*Manufacturing, \*Radio receivers, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.

**Identifiers:** Developing country application.

The small radio manufacturing plant described in the report is designed to produce radio receiving sets where the demand for this product exists and where such a local operation would be practicable. It has several particular characteristics of special merit in connection with programs for economic development. The most important advantages briefly stated are as follows: Small investment of fixed capital; range of choice as to volume of operation to be undertaken; the rapidity with which the project may be changed; the ease with which operations may be expanded in many different directions; the speed with which unskilled workers can become proficient even though they do not have a technical education; the social and cultural value of the product, which should lead to its wide distribution; the ease with which such a product can be maintained; and the high proportion of production cost which goes to employment of local people. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 922/2**

**PC A03/MF A01**

Andrews (George H.) Engineering Associates, Inc., Washington, DC.

**Plant Requirements for Manufacture of Boxes and Shooks**  
Dec 57, 49p

**Descriptors:** \*Industrial plants, \*Manufacturing, \*Boxes(Containers), Wood products, Assembling, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.

**Identifiers:** Developing country application.

The small box and shook plant described in the report is intended to manufacture wooden boxes and shooks where the demand for these products exists and where such a local operation would be practicable. The machinery and equipment recommended is adequate to manufacture any design or size of wooden box or shook. A shook is a knocked down box. It includes all the wood pieces to make a box, bundled together complete, ready for assembling and nailing. The end pieces in a shook are usually assembled, and nailed, if they consist of more than one piece. Boxes are usually ordered in the form of shooks where they are shipped long distances before being used. Shipment as shooks saves a great deal of shipping space, which, in turn, reduces the cost of freight, and saves warehouse space at the point of use. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installa-

tions will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 923/0**

**PC A02/MF A01**

Wolf Management Engineering Co., Chicago, IL.

**Plant Requirements for Manufacture of Carob Molasses**  
Sep 57, 24p

Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

**Descriptors:** \*Industrial plants, \*Manufacturing, Requirements, Production methods, Production capacity, Operating costs, Fruits, Materials estimates, Equipment, Plant layout, Cost estimates, Labor estimates.

**Identifiers:** Developing country application, \*Molasses, \*Carob.

The report outlines a modern plant of modest capacity which would most likely be applicable to the average economic location where carob is grown and harvested on a limited commercial basis. It is assumed that the basic production is carob molasses or syrup with sugars or sucrose still remaining in the raw liquid. The processing of gums from the seeds and other products from the residual pulps is not considered and would require specific reports, particularly if the refined sugars, gums and residual usable pulp are to be considered end products. The report is based on a daily processing capacity of 21,875 lbs. of unhulled pods. This would accommodate the average annual yield of 8,750 lbs. per acre from 300 acres, with the mill operating on the basis of 120 days per year, 24 hours per day. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 936/2**

**PC A03/MF A01**

Hesperian Foundation, London (England).

**Health Care and Human Dignity - A Subjective Look at Community-based Rural Health Programs in Latin America**  
Sep 76, 27p

Sponsored in part by National Fund for Research into Crippling Diseases, London (England), and Agency for International Development, Washington, DC. Paper presented at Symposium on Appropriate Technology and Delivery of Health and Welfare Services for the Disabled in Developing Countries, Held at Oxford, England on September 26-30, 1976.

**Descriptors:** \*Latin America, Rural areas, Communities.

**Identifiers:** \*Rural health services, \*Health care, Developing country application, Health programs, Health care delivery, Foreign countries, Primary health care, \*Health planning.

The paper is an interesting and practical look at health care programs in rural communities. It explores ways in which existing health programs help either to cripple communities or to make them whole. Steps are briefly explored which are being taken or could be taken to implement a regional or national approach to rural health care that is community supportive.

**PB-292 937/0**

**PC A18/MF A01**

Ministerio de Planificacion y Politica Economica, Panama City (Panama). Dept. de Politica Cientifica y Tecnologica.

**Estudios Sobre Politica Cientifica y Tecnologica de Panama (Studies on the Scientific and Technological Policy in Panama)**  
Oct 77, 407p

**Descriptors:** \*Technology transfer, \*Industries, \*Panama, Research, Inventions, Patents, Capital, Investments, Developing countries, Food industry, Problem solving, Law(Jurisprudence), International relations, Government policies.

**Identifiers:** \*Industrial technology, Research and development, Trademark registration, Trade-

marks, Information needs, Scientific research, Developing country application.

In broad terms, all papers deal with technology transfer in terms of industrial property, inventions, patents, technical know-how, scientific and technological needs analyses, the R&D system, and science policy in Panama. Possible problem areas are identified which may result from laws (on patent infringements, novelty of industrial designs and models, commercial trademarks) which a developing country must promulgate to allow free access to, and technology transfer of, scientific and technical information. Rights of third parties are discussed in relation to trademarks which cannot be registered. For example, the well known trademark of a food product should not be used to identify a pesticide. The relationship between multinational capital investment and the foodstuffs industry is outlined. Priority items in the national development plan are mentioned. A study of general lines of generation, dissemination and integration of science policy in Panama is presented as part of the overall effort toward the identification and solution of problems; this will lead to greater development of domestic science and technology in various sectors (tourism, agriculture, fishing, and health).

**PB-292 938/8**

**PC A04/MF A01**

Instituto de Investigacion Tecnologica Industrial y de Normas Tecnicas, Lima (Peru).

**Efecto del Proceso de Importacion de Tecnologia en el Peru (Periodo 1971/74) (Effect of the Process of Technology Importation into Peru (1971-1974 period))**  
1974, 75p Rept no. POLITICA TECNOLOGICA-5

**Descriptors:** \*Technology transfer, \*Peru, Methodology, Surveys, Personnel development, Evaluation, Statistical data, Patents, Licenses, Cost engineering, Profits, International trade, Imports, Contracts, Balance of payments.

**Identifiers:** \*Industrial technology, Trademarks, Monopoly, Developing country application.

The methodology used to evaluate technology transfer by importation into Peru is outlined. Methodological methods included data collection, personnel training, analysis, and evaluation of results. Research centered upon reducing costs to the country receiving the technology, upon preventing excess profits, and upon restrictive clauses (listed in the document annex). Statistics are presented on the specific nature of the technology to be transferred, by industry, by country of origin, and by the effect on the domestic industry. Concrete costs in relation to their effect on balance of payments and on monetary benefits to Peru are outlined; stronger monetary controls are recommended. A legal analysis of restrictions on technology transfer of 404 existing technology contracts is provided. It is noted that these contracts are the legal instruments by which monopolies are engendered and proliferate. In this connection, it is significant that only 10% of the patents registered in Peru are of national origin. This factor, together with the increasing trademark licensing, accounts for growing technological dependence. Based on this study Peru followed Decision 24 of the Andean Group, which deals with patents and trademarks. Statistics discriminate number of contracts and restrictive clauses by geographical world regions. Although indigenous industries (iron, copper mining, fishing) have been developing, it is noted, in the struggle to consolidate and win new markets, advanced technology is required to decrease costs.

**PB-292 943/8**

**PC A04/MF A01**

Armstrong Cork Co., Lancaster, PA.

**Power Plant Training Course - Steam Accessories**

Technical bulletin.

Mar 61, 54p ICA-TB-16

Sponsored in part by International Cooperation Administration, Washington, DC. Office of Industrial Resources.

**Descriptors:** \*Education, \*Control equipment, \*Boilers, Instrumentation, Steam traps, Separators, Flow regulators, Accessories.

**Identifiers:** Developing country application.



This presentation on Steam Accessories was developed to help train employees to understand facts of importance about accessories. To avoid confusion, no attempt has been made to cover all the accessories of all manufacturers. The information given here does include A.S.M.E. types --- a knowledge of which will help anyone understand accessories of the same types.

**PB-292 944/6** **PC A02/MF A01**  
International Cooperation Administration, Washington, DC. Office of Industrial Resources.  
**Problems in Business Management: Management Training**  
Technical bulletin.  
Jun 62, 22p Rept no. TB-30

Descriptors: \*Management training, \*Personnel management, Organization theory, Meetings, Job analysis, Industrial relations, Human factors engineering, Production control, Cost effectiveness, Leadership, Supervision, Executive ability, Communicating, Instructional materials.  
Identifiers: \*Responsibility, Administrative problems, Developing country application.

Good results can often be obtained with a minimum of expense, providing that each head of a department plays his part. The results can be measured as follows: In terms of decrease in the problems which the head of the department encounters which, in turn, gives him: - More time for planning improvements, less disorder, less confusion, fewer accidents, better morale. In terms of economy, some direct results are: less time to train new employees, fewer broken tools, less defective work, increased production.

**PB-292 945/3** **PC A03/MF A01**  
International Cooperation Administration, Washington, DC. Office of Industrial Resources.  
**Problems in Business Management - Market Development**  
Technical bulletin.  
1962, 44p Rept no. TB-34

Descriptors: \*Marketing, \*Economic factors, Education, Management training, Planning, Production control, Finance, Sales, Market research, Industrial relations, Organization theory, Public relations, Records management, Instructional materials.  
Identifiers: \*Business education, Administrative personnel, Developing country application.

Planning and control of production as well as of costs depend to a large extent upon anticipated sales. The brochure discusses marketing in all its various aspects. Selling is imperative to any business, and for this reason it takes into consideration the psychological aspect in order to know the attitude required by business management. The three essential functions of any management which are basic for its business are: To finance, to produce, and to sell. Only through sales can a business progress; therefore, can a management ignore the world around it and produce only for the pleasure of it.

**PB-292 946/1** **PC A03/MF A01**  
Johnson and Johnson, New Brunswick, NJ.  
**Conference Leadership Training**  
Training manual  
Oct 56, 49p AID/TM-21

Descriptors: \*Management training, \*Leadership, \*Meetings, Supervision, Personnel management, Industrial training, Supervisors, Industrial relations, Group dynamics, Planning, Educational sociology, Social communication.  
Identifiers: \*Training techniques, \*Conferences, Supervisory training, Discussion groups, Developing country application.

The manual includes steps in leading a conference, techniques for controlling and guiding a conference, techniques of the approach, practice conferences, types of conferences, preparing and planning the conference, responsibilities of conferees and summary of conference leadership techniques.

**PB-292 950/3** **PC A05/MF A01**  
Agency for International Development, Washington, DC. Communications Resources Div.  
**Programme de Vivres pour la Paix: L'Alimentation des Populations (Food for Peace Around the World)**  
1963, 97p

Descriptors: \*Food dispensing, Food services, Food preparation, Kitchen equipment and supplies, School\*, Communities, Developing countries.  
Identifiers: Villages, Developing country application, School lunch program.

The publication suggests ways of setting up or improving simple and inexpensive feeding centers, ways of using local food, and ways of preparing and serving the food. The material may be helpful to all who are working to improve health and well-being through community feeding centers and school lunch programs.

**PB-292 953/7** **PC A04/MF A01**  
International Cooperation Administration, Washington, DC. Office of Industrial Resources.  
**Economics Training - Charts**  
Technical bulletin.  
Apr 61, 70p Rept no. TB-40

Descriptors: \*Economics, \*Education, \*Visual aids, Charts, Photographs, Training devices, Prices, Supply(Economics), Demand(Economics), Competition, Salaries, Productivity, Government, Cost analysis, Economic conditions.  
Identifiers: \*Training, Money systems, Expenditures, Developing country application.

The pamphlet contains charts and visual aids normally used in connection with the economic training program in Technical Bulletin No. 22 entitled 'Economics Training'.

**PB-292 955/2** **PC A03/MF A01**  
Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements to Set Up and Operate a Phosphate Processing Plant**  
May 59, 39p  
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Chemical industry, \*Industrial plants, \*Manufacturing, \*Inorganic phosphates, Requirements, Production management, Production methods, Production capacity, Operating costs, Fertilizers, Calcium phosphates, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Process charting.  
Identifiers: Developing country application.

Practically all fertilizers used in the United States are prepared on a super-phosphate base. This material is used alone in large tonnages and almost invariably is the component present in large quantities in mixed fertilizer. Since the manufacture of superphosphate consumes much sulphuric acid, the making of this important fertilizer material is often associated with the making of sulphuric acid. In fact, economic considerations are making it necessary that the large scale superphosphate maker be also a sulphuric acid manufacturer. Successful manufacture of either sulphuric acid or superphosphate is today necessarily a large-scale business. The small manufacturer of these commodities usually is at a great economic disadvantage. The capital required for materials handling and skilled supervision for both superintendence and general management place disproportionately great burdens on any plant of small output. This manual describes a plant which is of adequate size and also capable of considerably increased output without proportionate capital expenditures. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be

considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 956/0** **PC A02/MF A01**  
Suburban Research Corp., Gaithersburg, MD.  
**Plant Requirements for Manufacture of Aluminum Architectural Specialties**  
Sep 57, 15p  
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Aluminum, \*Doors, \*Windows, Requirements, Production management, Production methods, Production capacity, Operating costs, Metal shapes, Metal sheets, Materials estimates, Equipment, Plant layout, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application.

The report presents information on total investment involved, machinery required, and manufacturing costs for establishing and operating a small plant to produce the following aluminum articles for the construction trade: sliding doors, louver type windows, windows of various types, aluminum frames for picture glass doors, show cases for stores, doors for showers, and gutters and down spouts (also in copper). The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 957/8** **PC A03/MF A01**  
Andrew (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements to set up and Operate Small Steel Rolling Mill**  
Feb 58, 46p  
Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div. and Office of Technical Services, Washington, DC.

Descriptors: \*Industrial plants, \*Steel plants, \*Manufacturing, \*Hot rolling, \*Bars, \*Metal shapes, Requirements, Reinforcing steels, Production management, Production methods, Production capacity, Operating costs, Billets, Materials estimates, Equipment, Plant layout, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application.

The small steel rolling mill described in this brochure is intended to manufacture hot rolled reinforcing bars and merchant shapes from billets or ingots where the demand for such products exists and where such a local operation would be practicable. Either billets or ingots will be adaptable for use as the raw material in this mill. However, for the purpose of simplification, only billets are discussed. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 958/6** **PC A03/MF A01**  
Andrews (George H.) Engineering Associates, Inc., Washington, DC.  
**Plant Requirements for Manufacture of Jute Yarn**  
Oct 61, 33p  
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Yarns, Carding, Spinning(Staple fibers), Requirements, Production management, Production meth-



ods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Textile processes.

Identifiers: Developing country application, \*Jute.

The purpose of the report is to present basic information for establishing a manufacturing plant, in a foreign country, to produce jute yarn. Some of the uses of this product are the following: rug backing, twine, feed bags, furniture webbing, auto upholstery supports, electric cable covering, sugar bags, fertilizer bags, cotton bale covering, linoleum backing, reinforced paper, rope, knit tubing, hooked rugs and embroidery, women's skirts, brattice cloth (mine ventilating), nursery burlap, and rug pad centers. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 959/4**

**PC A03/MF A01**

Middle West Service Co., Chicago, IL.

**Plant Requirements for Manufacture of Brass Table Lamps**

Sep 61, 36p

Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Lamps, Brasses, Assembling, Finishing, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.

Identifiers: Developing country application.

The purpose of the report is to present basic information for establishing a manufacturing plant in a foreign country to produce approximately 4,000 brass lamps per month. Many types of brass lamps are manufactured in the United States each year, and each type is produced in a vast number of sizes and designs. Thus labor and material costs will vary according to the type, size, and design, in addition to the quality of the lamp produced. Furthermore, it has become a very prevalent practice in the United States for brass lamp manufacturers to buy the component parts of a lamp from other companies, such as white metal casting companies, metal stamping, spinning, and electroplating companies, and lamp shade manufacturers. This results in the lamp manufacturer's activities being confined to finishing and assembling, which is the type of plant described in this report. Separate, specialized operations such as this represent a very economical method for producing brass lamps. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 960/2**

**PC A03/MF A01**

Office of Technical Services, Washington, DC.

**Plant Requirements to Set Up and Operate a Copper Wire Drawing and Insulating Plant**

Jan 62, 39p

Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div.

Descriptors: \*Industrial plants, \*Wire drawing, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Bare wire, Insulated wire, Extruders.

Identifiers: Developing country application.

The purpose of the report is to present basic information relative to the establishment of a copper wire drawing and insulating facility in a foreign country. This plant will be equipped to produce both bare and insulated copper wire from copper rods. Future production might be diversified to include tinned and enameled wires, an increased range of wire sizes, and the manufacture of twisted insulated wires or small cables. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-292 964/4**

**PC A03/MF A01**

Johnson and Johnson, New Brunswick, NJ.

**Management Development Programs for Executives and Supervisors and a Manufacturing Division**

Technical bulletin

Oct 56, 37p ICA/TB-24

Descriptors: \*Management training, \*Manufacturing, \*Executives, \*Supervisors, Personnel development, Supervision, Leadership, Executive ability, Industrial relations, Social communication, Personnel management, Performance evaluation. Identifiers: \*Supervisory training, Training techniques, Developing country application, Skill development, Administrative principles.

The manual provides information on supervisory training, human relations skills, administrative skills, technical skills, training tools, and techniques, and requirement and functions of executive development.

**PB-292 965/1**

**PC A03/MF A01**

General Mills, Inc., Minneapolis, MN.

**Maintenance Training Program**

Technical bulletin.

Dec 56, 39p ICA/TB-26

Descriptors: \*Maintenance, \*Specialized training, \*Personnel development, Guidelines, Objectives, Performance tests, Requirements, Qualifications, Abilities, Employment.

Identifiers: Developing country application.

The manual is an administrative guide for conducting maintenance training procedures. It provides a description of the procedures involved, and the responsibilities assigned in the operation of a Maintenance Training program. A Maintenance Training Program is a coordinated program of on-the-job training and experience. Its over-all objectives are to develop and assist maintenance personnel to qualify for higher classifications, subject to operating requirements. Measurement of the degree of readiness is determined through the administration of the Maintenance 3rd Class and Maintenance 1st Class tests. The basic elements of the training procedure are as follows: (1) A progress appraisal form; (2) General description of areas of knowledge and ability necessary to qualify for Maintenance 1st Class rating; (3) A perpetual skill and training inventory; and (4) A list of approved related training courses available to local plant personnel.

**PB-292 976/8**

**PC A08/MF A01**

Institute of Medicine, Washington, DC.

**Health in Egypt: Recommendations for U.S. Assistance**

Final rept.

Jan 79, 158p Rept no. IOM-79-01

Contract AID/NE-C-1476

Descriptors: \*Egypt, Population growth, Africa, Recommendations, Nutrition, Programs, Criteria, Drugs, Emergency medical services, Research, Technical assistance, National government, Demography, Socioeconomic factors, Infectious diseases, Public health.

Identifiers: Developing countries, Agency for International Development, Foreign countries, Hospital administration, \*Health care, Health status, Health resources, Family planning.

The report sets out criteria for future AID health, population, and nutrition programs, recommends some general program areas, pinpoints some specific problems in these areas, and suggests ways in which the administration of the U.S. program in Egypt might be strengthened. AID support, the report says, should go to sustained efforts to reduce infant, pre-school child, and maternal mortality; a program to improve production and distribution of vaccines and pharmaceuticals needed for the first-mentioned effort; establishment of nationwide emergency medical services; strengthening hospital administration; a cooperative research program for health, family planning, and nutrition. Report also contains five chapters of background information on Egyptian economic, demographic, and social factors; health problems; health resources; population and family planning; and nutrition.

**PB-292 983/4**

**PC A04/MF A01**

Johnson and Johnson, New Brunswick, NJ.

**Communications in Business and Industry**

Technical Bulletin.

Oct 56, 53p ICA-TB-20

Descriptors: \*Social communication, \*Communicating, \*Personnel management, Communications management, Policies, Cooperation, Motivation, Morale, Attitudes, Industrial relations, Public relations, Opinions, Psychological effects, Supervisors, Employees.

Identifiers: Developing country application.

The report contains information on developing effective downward communications, steps in the program for reviewing and improving communications, conference outline on communications down, communications devices used in Johnson & Johnson, psychology of change, guiding rules for communications, check list of commonly used devices and evaluation of meetings on communications.

**PB-292 984/2**

**PC A03/MF A01**

Agency for International Development, Washington, DC. Communications Resources Div.

**Problems in Business Management, Production Planning**

Jun 62, 38p Rept no. TECHNICAL BULL-33

Descriptors: \*Production planning, \*Production control, Productivity, Scheduling, Capacity, Resource allocation, Personnel management, Supervision, Prices, Cost engineering, Purchasing, Supply management, Industrial relations, Problem solving, Meetings, Management training, Manufacturing.

Identifiers: Business administration, Training techniques, Developing country application.

The pamphlet contains a business management training course on the subject of production planning and control. The information is particularly useful to developing countries.

**PB-292 990/9**

**PC A03/MF A01**

International Cooperation Administration, Washington, DC. Office of Industrial Resources.

**Problems in Business Management. Nature and Scope of Management Responsibilities**

Technical bulletin.

Jun 62, 34p Rept no. TB-27

Descriptors: \*Management training, \*Job analysis, Personnel development, Industrial relations, Organization theory, Production control, Sales, Financing, Coordination, Market research, Leadership, Executive ability, Meetings.



Identifiers: \*Responsibility, Developing country application.

The purpose was to present information and stimulate interest in the principles of techniques of modern management. The objectives cite: the employer's duties; the personality of the enterprise director; Organization of the enterprise; personnel training, human relations, production, sales, and financing.

**PB-293 000/6** PC A02/MF A01  
Aries Associates, Inc., Stamford, CT.

**Plant Requirements for Manufacture of Brewers Flakes**  
Mar 60, 25p  
Prepared in cooperation with Robins (A. K.) and Co., Inc., New York. Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, Requirements, Production methods, Production capacity, Operating costs, Grains(Food), Materials estimates, Equipment, Plant layout, Machinery, Production planning, Cost estimates, Labor estimates, Beer.  
Identifiers: Developing country application, \*Brewer's flakes.

The report outlines a small plant for the production of Brewer's Flakes of 4 tons per day capacity. The report is one of a series of reports resulting from overseas inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-293 001/4** PC A03/MF A01  
Lederer (A. M.) and Co., New York.

**Plant Requirements for Manufacture of Flexible Steel Conduit**  
Feb 57, 36p  
Prepared in cooperation with Sleeper and Hartley, Inc., Worcester, MA., and Waterbury Farrel Foundry and Machine Co., CT. Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Pipes(Tubes), Flexible structures, Steels, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application, \*Conduits.

The report outlines the type of plant required for the manufacture of flexible steel conduit. This plant is also capable of manufacturing many similar products with the same equipment, such as flexible tubing and exhaust hose. With the addition of some relatively inexpensive equipment, the plant can manufacture moisture-proof conduit and tube, armored cables, parkway cables, and similar armored products. In addition to steel, other metals such as aluminum, brass, and bronze may be used to make conduit, tubing, and armored cable. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-293 002/2** PC A03/MF A01  
Andrews (George H.) Engineering Associates, Inc., Washington, DC.

**Plant Requirements for Manufacture of Animal Feed Pellets**  
May 59, 43p  
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Feeding stuffs, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application.

The report outlines the type of plant required for the manufacture of animal feed pellets. The use of scientifically balanced diets is a widely recognized necessity for obtaining best results in the raising of animals and poultry. The diets vary with the type of animal, its age, and the purpose for raising it. In addition, the knowledge gained through research results in continuous changes in the recommended diets. Formulas for each of several applications are included in the report. They are representative of an infinite number of possible formulas for each of the conditions. The food available in each locality should be substituted in these formulas to keep the cost at a minimum. This can be done while maintaining quality. The tables of costs include a blank column where the local costs of all the items can be entered. The capacity of the plant is approximately 2 tons per hour, or 50 tons in 24 hours, based on the capacity of the pellet machine. The annual production is estimated at 12,500 tons. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-293 003/0** PC A03/MF A01  
Snell (Foster D.), Inc., New York.

**Plant Requirements for Manufacture of Castor Oil**  
Aug 59, 26p  
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Castor oil, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application.

The report covers the procedures, plant equipment, and economics involved in the processing of 5,000 tons per year of castor beans to castor oil and oil derivatives. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-293 004/8** PC A03/MF A01  
Andrews (George H.) Engineering Associates, Inc., Washington, DC.

**Plant Requirements for Manufacture of Woolen Yarn**  
Sep 61, 31p  
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Woolen spun yarns, Carding, Spinning(Staple fibers), Requirements, Production management,

Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application.

The plant described in the report is intended to manufacture woolen yarn. Compared with the yarn industry in the United States this is a small plant. However the machinery and equipment listed is capable of producing woolen yarn on a competitive basis in a foreign country. The annual capacity of this plant is about 400,000 pounds or 200 tons. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-293 005/5** PC A02/MF A01  
Methods Engineering Council, Pittsburgh, PA.

**Plant Requirements for Manufacture of Shell Buttons**  
Jul 55, 22p  
Sponsored in part by International Cooperation Administration, Washington, DC.

Descriptors: \*Industrial plants, \*Manufacturing, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application, \*Buttons, Shells.

The purpose of the report is to present basic information for establishing and operating a plant to manufacture shell buttons in a country with a tropical or semi-tropical climate. The information includes general manufacturing methods, plant layout, and costs of materials, equipment, and labor based on the assumptions contained in this report. The plant described is considered to be the economic minimum in size which utilizes suitable equipment and methods. Products are to be simple and varieties limited in order that costs may be kept to a minimum. As an essential preliminary, potential plant operators must determine whether or not there is a market for the products of this plant. Naturally, they must be willing to assume the risks inherent in any business. The profits shown in the profit and loss statement are illustrative and depend upon market conditions, good management, and local factors.

**PB-293 006/3** PC A03/MF A01  
Andrews (George H.) Engineering Associates, Inc., Washington, DC.

**Plant Requirements for Manufacture of Rice Bran Oil**  
Sep 61, 44p  
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Oils, Rice, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates.  
Identifiers: Developing country application, \*Rice bran, Bran.

The purpose of the report is to present basic information for establishing a rice bran oil plant in a foreign country. The annual production of the plant is 4,000 tons of Rice bran oil, and 22,000 tons of Bran meal. The report was prepared to answer overseas technical inquiries on factory operation, management and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.



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ative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-293 007/1** PC A03/MF A01  
Andrews (George H.) Engineering Associates, Inc., Washington, DC.

### **Plant Requirements for Manufacture of Raw Sugar**

May 59, 36p

Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, Sugar crops, Requirements, Production management, Production methods, Production capacity, Operating costs, Sugarcane, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates. Identifiers: Developing country application, \*Raw sugar.

The sugar plant described in the report is to manufacture raw sugar from sugar cane. Production of cane varies with many conditions such as soil, temperature, water, and climate; and yield amounts to from 40 to 75 tons per acre. The plant herein described requires an input of 600 tons of cane per day for its economical operation and the harvesting campaign usually lasts about five months. It is therefore assumed that it will draw its raw materials from an area about 2,000 acres under cultivation. The output of this plant will amount to approximately 60 tons of raw sugar per day. Raw sugar is produced near the cane growing areas by mills usually called 'centrals.' The raw sugar from several centrals is then shipped, often long distances and usually overseas, to great refineries at the seaports of more densely populated areas where the consumption is high. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-293 008/9** PC A03/MF A01  
Andrews (George H.) Engineering Associates, Inc., Washington, DC.

### **Plant Requirements for Manufacture of Pharmaceutical Glass**

Sep 57, 38p

Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Glass, \*Medical equipment, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates. Identifiers: Developing country application.

The small pharmaceutical glass plant described in the report is intended to manufacture glass tubing, ampoules and vials for antibiotics. Other pharmaceutical products such as syringes and glass for laboratory uses can be produced in this plant. The glass tubing ampoules and vials will be of neutral glass. The ampoules and vials shall have a capacity of from five to eight cubic centimeters. Other sizes and other products may be produced in this plant but for the purpose of the report only the above products will be considered. The annual capacity of this plant is about seven tons of glass per day which will produce ten million ampoules and fifteen million vials per year having a capacity of

from five to eight cubic centimeters and provide some additional tubing for other products. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-293 009/7** PC A02/MF A01  
Office of Technical Services, Washington, DC.

### **Plant Requirements for Manufacture of Fish Meal**

Feb 56, 14p

Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, \*Fish protein concentrates, Fishes, Requirements, Production methods, Production capacity, Equipment, Plant layout.

Identifiers: Developing country application.

The report outlines the type of plant required for the manufacture of fish meal. Such a plant is to process about five tons of raw material, fish and fish waste, per eight hours. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. Plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-293 010/5** PC A03/MF A01  
Andrews (George H.) Engineering Associates, Inc., Washington, DC.

### **Plant Requirements for Manufacture of Lead Pencils**

Oct 61, 37p

Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Descriptors: \*Industrial plants, \*Manufacturing, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates. Identifiers: Developing country application, \*Pencils.

The purpose of the report is to present basic information for establishing a manufacturing plant in a foreign country to produce lead pencils with a capacity of 500 gross of pencils per day. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-293 011/3** PC A03/MF A01  
Andrews (George H.) Engineering Associates, Inc., Washington, DC.

### **Plant Requirements for Manufacture of Aluminum Kitchenware**

Jan 62, 33p

Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div.

Descriptors: \*Industrial plants, \*Manufacturing, \*Kitchen equipment and supplies, Aluminum, Requirements, Production management, Production methods, Production capacity, Operating costs, Metal sheets, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates. Identifiers: Developing country application.

The purpose of the report is to present basic information for establishing a manufacturing plant in a foreign country to produce aluminum kitchenware from aluminum sheets. There are many kitchen utensils which can be made from aluminum. These include roasting pans, cake pans, muffin pans, biscuit and cookie baking sheets, casseroles, can openers, knives, forks, spoons, molds, juice extractors. The type particularly suitable for manufacture from aluminum includes kettles, double boilers, waterless cookers, and saucepans. A saucepan has been taken as representative of this group and the estimates in this report are based on the manufacture of such a representative piece. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

**PB-293 036/0** PC A15/MF A01  
Stanford Univ., CA. Graduate School of Business.

### **Plant Size, Location and Time-Phasing**

Alan S. Manne. Mar 66, 341p

Prepared in cooperation with Indian Statistical Inst., Calcutta, and Massachusetts Inst. of Tech., Cambridge. Center for International Studies. Sponsored in part by Ford Foundation, New York.

Descriptors: \*Plant location, \*Time measurement, \*Size determination, \*Investments, Financial management, Planning, Manufacturing, Industries, Sodium hydroxide, Cements, Aluminum, Fertilizers, Supply(Economics), Demand(Economics), Materials estimates, Operating costs, Cost engineering, Production engineering, India. Identifiers: \*Organization size(Groups), Case studies, Economics of scale, Developing country application, Capital, Economic analysis, Dynamic programming.

The volume is concerned with planning investments in a series of future manufacturing facilities. Case studies are reported for four heavy process industries in India: aluminum, caustic soda, cement, and nitrogenous fertilizers. In these sectors, there are significant economies-of-scale in manufacturing, and there is a close interdependence between the size, location and time-phasing of new capacity. Problems of investment planning have both a theoretical and a practical side. They are of common interest to managers, engineers, operations researchers, and economists. In preliminary presentations of this material, the author has observed that the type of question raised depends heavily upon the individual's professional background. The manager or engineer is usually concerned with the practical relevance, the realism and the transferability of these studies; the operations researcher tends to concentrate on the algorithmic and the uncertainty aspects; and the economist focuses upon the implications for development planning.

**PB-293 096/4** PC A03/MF A01  
CACI, Inc.-Federal, Arlington, VA. Policy Sciences Div.

### **Market Assessment for Transportation of Trade with Developing Countries. Volume I. Executive Summary**

Final rept. 1977-87

F. Abolfathi, G. Keynon, W. Harvey, I. Ibrahim, and S. Royanian. Mar 79, 27p\* MA-RD-940-79001

Contract MA-7-38062



# APPROPRIATE TECHNOLOGY ABSTRACTS

Also available in set of 3 reports PC E12, PB-293 095-SET.

Descriptors: \*Market research, \*International trade, \*Marine transportation, \*Developing countries, Transportation, Cargo transportation, Fleets, Exports, Imports, Economic development, Assessment, Forecasting, Market value, Objectives, Market surveys, Transports(Ships), Demand(Economics).  
Identifiers: \*Commodities.

The purpose of the study is to provide information to support long-range planning by U.S. flag operators, including ten-year forecasts of U.S.-LDC (less-developed countries), trade flows (1977-1987) to estimate the likely size of future markets, and a review of trade-relevant service and competitive conditions that are likely to affect future maritime service to LDC's. The analysis focuses on 111 less-developed countries. Volume I provides a condensed review of the overall study and highlights from the research findings.

**PB-293 097/2** PC A08/MF A01  
CACI, Inc.-Federal, Arlington, VA. Policy Sciences Div.

**Market Assessment for Transportation of Trade with Developing Countries. Volume II. Research Findings**  
Final rept. 1977-87

F. Abolfathi, G. Keynon, W. Harvey, I. Ibrahim, and S. Royanian. Mar 79, 175p\* MA-RD-940-79002

Contract MA-7-38062

Also available in set of 3 reports PC E12, PB-293 095-SET.

Descriptors: \*Market research, \*International trade, \*Marine transportation, \*Developing countries, Transportation, Cargo transportation, Transports(Ships), Fleets, Exports, Imports, Economic development, Assessment, Forecasting, Market surveys, Tables(Data), Demand(Economics).  
Identifiers: \*Commodities, Geocoding.

The purpose of the study is to provide information to support long-range planning by U.S. flag operators, including ten-year forecasts of U.S.-LDC (less-developed countries), trade flows (1977-1987) to estimate the likely size of future markets, and a review of trade-relevant service and competitive conditions that are likely to affect future maritime service to LDC's. The analysis focuses on 111 less-developed countries. Volume II contains the research findings and presents the major components from each phase of the study in a form accessible to a wide range of readers. Materials are collected and organized by major world areas, subdivided by regions and again by countries.

**PB-293 098/0** PC A20/MF A01  
CACI, Inc.-Federal, Arlington, VA. Policy Sciences Div.

**Market Assessment for Transportation of Trade with Developing Countries. Volume III. Appendices**  
Final rept. 1977-87

F. Abolfathi, G. Keynon, W. Harvey, I. Ibrahim, and S. Royanian. Mar 79, 471p\* MA-RD-940-79003

Contract MA-7-38062

Also available in set of 3 reports PC E12, PB-293 095-SET.

Descriptors: \*Market research, \*International trade, \*Marine transportation, \*Developing countries, Transportation, Cargo transportation, Transports(Ships), Fleets, Exports, Imports, Economic development, Assessment, Forecasting, Market surveys, Tables(Data), Demand(Economics), Bibliographies.  
Identifiers: \*Commodities, Geocoding.

The purpose of the study is to provide information to support long-range planning by U.S. flag operators, including ten-year forecasts of U.S.-LDC (less-developed countries), trade flows (1977-1987) to estimate the likely size of future markets, and a review of trade-relevant service and competitive conditions that are likely to affect future maritime service to LDC's. The analysis focuses on 111 less-developed countries. Volume III contains

the appendices and the analysis used to generate each forecast and evaluation during the study. There are 11 appendices. A: overall technical approach, key assumptions, and qualifications. B: LDC's regional groupings described and explained. C: major assumptions on behaviors and economic prospects of LDC's determined to be influential for the overall forecasts. D: demand and supply estimates for each major commodity examined in the study. E: model equations employed in forecasting. F: long-term forecasts of national accounts for each country as annual growth rates. G: the aggregated forecasts for the GDP and trade of each region in 1975 U.S. dollars. H: LDC future national fleet growth. I: survey of recent conditions and projected developments of LDC ports and inland transport links. J: trade and transport of five communist LDC's. K: bibliographic references.

**PB-293 105/3** PC A06/MF A01  
Illinois Inst. of Natural Resources, Springfield. Div. of Alternative Energy.

**Illinois Appropriate Technology Project Book**  
Jill Kunka. 8 Nov 78, 103p Rept no. ILLDOE-78/10

Descriptors: \*Directories, Buildings, Greenhouses, Education, Planning, Water conservation, Solid waste disposal, Solar energy, Wind power, Hydroelectric power generation, Biomass, Organizations, Research projects, Personnel, Financing, Guidelines, Illinois.  
Identifiers: \*Energy conservation, Appropriate technology, Waste recycling, Waste oils.

The Project Book is a guide for local governments and organizations interested in developing appropriate technology projects, such as low cost solar and other alternative energy projects, community gardening projects, and water conservation projects. It includes sections on the Institute of Natural Resources and other coordinating agencies, a guide to finding funding sources, bibliographies, and summaries of over 100 ongoing Illinois projects.

**PB-293 140/0** PC A16/MF A01  
Jain (T. C.), New Delhi (India).  
**Survey of Indian Agro-Bio-Economic and Allied Literature, 1947-1975. A Bibliography. Volume I - Classified Part**  
T. C. Jain. c1978, 364p

Descriptors: \*Social sciences, \*Agriculture, \*Bibliographies, \*India, \*Economics, Farm crops, Farm processing, Agricultural products, Soil conservation, Irrigation, Agricultural economics, Agricultural engineering, Agronomy, Rural areas, Social change, Community development, Political science, Public administration, Education, Mathematics, Chemistry, Oceanology, Geology, Biology, Medicine.  
Identifiers: Villages, Developing country application.

This volume is a comprehensive record of Indian publications on the subject of agriculture and agricultural sciences, social sciences, physical sciences, medicine, and economics. The 5000 entries included in the volume represent books, monographs, mimeographed studies, serials, and continuations, series publications, and significant pamphlets. The classified part, which is the entirety of this volume, is designed for the subject approach and is grouped according to the universal decimal classification scheme (UDC B.S. 1000B; 1958 with expanded schedules).

**PB-293 141/8** PC A99/MF A01  
Jain (T. C.), New Delhi (India).  
**Survey of Indian Agro-Bio-Economic and Allied Literature, 1947-1975. A Bibliography. Volume 2 - Author Part, Title Part and Directory of Publishers**  
T. C. Jain. c1978, 640p

Descriptors: \*Social sciences, \*Agriculture, \*Bibliographies, \*India, \*Economics, Farm crops, Farm processing, Agricultural products, Soil conservation, Irrigation, Agricultural economics, Agricultural engineering, Agronomy, Rural areas, Social change, Community development, Political science, Public administration, Education, Mathematics,

ics, Chemistry, Oceanology, Geology, Biology, Medicine.  
Identifiers: Villages, Developing country application.

This volume is the continuation of the comprehensive record of Indian publications. The bulk of this volume is devoted to three areas: the author part, the title part, and a directory of publishers. The author part includes appropriate cross-references to variant forms of names. The title part combines extensive cross-references to alternative forms of titles. Each entry in all three parts contains the following information: author, title, place of publication and the publisher's name, year of publication, number of pages, size, and the price.

**PB-293 605/2** PC A02/MF A01  
Department of Agriculture Extension Service, Washington, DC.

**Seeing is Believing. How to Conduct Convincing Result Demonstrations**

Helen Strow, and Amy Cowing. Jan 60, 14p  
Sponsored in part by International Cooperation Administration, Washington, DC.

Descriptors: \*Technical assistance, \*Developing countries, \*Agriculture, Communicating, Farms, Farm crops, Farm processing, Public relations, Specialized training, Effectiveness.  
Identifiers: Developing country application, Agricultural extension services, Villages, \*Demonstration programs.

Workers around the world have found that the result demonstration is a convincing teaching method. Many people improve their living conditions after seeing a result demonstration. A result demonstration brings scientific methods to everyday situations and compares new and proved practices with the old. This small pictorial booklet is a guide on how to institute the result demonstration.

**PB-293 745/6** PC A04/MF A01  
General Accounting Office, Washington, DC. International Div.

**U.S. Development Assistance to the Sahel--Progress and Problems**  
Report to the Congress.

29 Mar 79, 69p Rept no. ID-79-9

Descriptors: \*Project management, \*Africa, Developing countries, Planning, Development, Droughts, Federal assistance programs, Foreign aid, National government.  
Identifiers: \*Agency for International Development.

The report discusses the problems encountered by the Agency for International Development and Action in planning, organizing, and implementing development activities in eight countries of Central and West Africa. It is one of a series of GAO reports discussing the management of programs for emergency drought relief and for long-term development.

**PB-293 759/7** PC A03/MF A01  
Oregon State Univ., Corvallis. International Plant Protection Center.

**Weed Control Systems and Systems Utilization for Representative Farms in Developing Countries**  
Annual rept. 1977-78.

1978, 35p Rept no. 22-C-78

Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Weed control, \*Developing countries, Systems engineering, Utilization, Farm management, Technology, Agricultural economics, Economic factors, Production, Project planning, Research management, Financial management, Technical assistance, Information services.  
Identifiers: \*Oregon State University, \*Agricultural research projects, Developing country application.

The booklet is the annual report of the AID/Oregon State University weed control system research project. Discussed are the program's objectives, a review of activities, a work plan, financial review, and appendixes which include a biblio-



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graphic list, word distribution of program materials and publications, and a list of project personnel.

**PB-293 760/5** PC A11/MF A01  
Tata Energy Research Inst., Bombay (India).  
**Directory of Solar Energy Research Projects in India**  
Mar 78, 231p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Directories, \*Research projects, \*Solar energy, \*India, Solar radiation, Heat storage, Energy storage, Space heating, Electric power generation, Heat exchangers, Air conditioning, Refrigeration, Heat pumps, Greenhouses. Identifiers: Listings, Solar collectors, Process heat, Photovoltaic conversion, Heat pipes, Solar ponds, Developing country application.

This directory contains data on about 140 research projects in the area of solar thermal conversion and photovoltaic processes. As a reference tool, the book should help in greater communication and cross fertilization of ideas in the field of solar energy and provide a panoramic view of solar energy research in India. The directory is divided into four sections: subject categories, list of institutions, list of investigators, and project information sheets.

**PB-293 762/1** PC A03/MF A01  
Small Business Administration, Washington, DC.  
**Petite Entreprise: 150 Questions (150 Questions for a Prospective Manufacturer)**  
William M. Hoad. Mar 53, 48p

Descriptors: \*Businesses, \*Manufacturing, \*Planning, Manufacturers, Organization theory, Finance, Product developing, Plant location, Equipment, Construction, Sales management, Personnel management, Production control, Marketing, Prices, Executive ability, Operating costs, Packaging, Insurance. Identifiers: \*Business education, Administration, Developing country application.

The booklet gives a prospective manufacturer the basic information he needs to start his enterprise. It covers administrative aptitude, business organization, the product, finance, insurance, siting, the factory, equipment and construction, planning and control, sales, personnel, packaging, marketing, costs and price, and general management.

**PB-293 763/9** PC A04/MF A01  
Arkansas State Dept. of Education, Little Rock. Vocational Div.  
**Formation Professionnelle: Conseils aux Maitres (Tips for Vocational Instructors)**  
1978, 52p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Education, \*Instructors, Schools, Instructional materials, Communicating, Organizing, Group dynamics, Leadership, Motivation, Guidelines. Identifiers: \*Classroom techniques, \*Teaching methods, Classroom arrangement, Developing country application, Instructional design, Teacher role.

The reference guide presents practical methods of controlling a class and passing on knowledge. Chapters are devoted to the task of the teacher; the organization of the course; preparing the lesson; principles of instruction; how to start a new class and instill interest in students; transmitting knowledge--introduction, presentation, on-the-job training, tests; various teaching methods--lectures, chats, demonstrations, films, visual aids, group discussions, blackboard, asking questions, guided studies; and how to conduct the class.

**PB-293 765/4** PC A05/MF A01  
West Virginia Univ., Morgantown.  
**Petite Entreprise: Manuel de Gestion Financiere (A Handbook of Small Business Finance)**  
Ralph B. Tower. 1961, 90p

Descriptors: \*Financial management, \*Businesses, Handbooks, Banking business, Finance, Work-

ing capital, Assets, Budgeting, Accounting, Investments. Identifiers: \*Small businesses, Loans, Stocks and bonds, Financial services, Developing country application.

The information provided in the book makes it a basic handbook on financial management. Chapters are devoted to financial documents, financial management, business formulas and rates of turnover, short- and long-term loans - financing through stocks and promissory notes, sources of financial aid, government loans, and budgets and treasuries. A small bibliography is included.

**PB-293 767/0** PC A03/MF A01  
Agricultural Research Service, Washington, DC.  
Animal Husbandry Research Div.  
**L'Elevage du Lapin (Raising Rabbits)**  
1978, 41p

Descriptors: \*Reproduction(Biology), \*Rabbits, \*Developing countries, Manuals, Breeding, Equipment, Feeding stuffs, Management, Animal diseases, Marketing, Food packaging, Tropical regions, Management. Identifiers: Developing country application.

The ABC's of rabbit raising are provided in this manual. Sections are devoted to choice of breed and breeders, lodging and equipment, hutches and burrows, feeding and watering, forage, cereals, supplements to the food, special feeds for gestating and lactating rabbits reproduction, care during transport, management of the stock, care in hot climates, prevention of disease and wounds, marketing, slaughter, butchering and packaging, and skinning.

**PB-293 782/9** PC A17/MF A01  
Egyptian Society of Civil Engineers, Cairo.  
**Proceedings of the Conference on Low-Income Housing Held at Cairo, Egypt on April 20-25, 1975**  
A. Moharram, H. A. Kaddah, G. E. Nassar, and L. S. Beedle. Apr 75, 399p  
Grant NSF-ENG74-00503-A02  
Prepared in cooperation with Academy of Scientific Research and Technology, Cairo. Sponsored in part by Agency for International Development, Washington, DC. and Joint Committee on Planning and Design of Tall Buildings, Bethlehem, PA.

Descriptors: \*Housing planning, \*Low income groups, \*Meetings, Egypt, Urban planning, Rural urban fringe, Urban relocation, Government policies, Social welfare, Residential buildings, Land use, Social effects, Project management, Social anthropology, Transportation, Services, Safety engineering, Maintenance, Economic impact, Masonry, Concrete construction, Steel construction. Identifiers: \*Low rent housing, \*Public housing.

Fifty countries participated in this conference which consisted of 15 sessions to discuss the global nature of the low-income housing shortage. The conference participants provide an in-depth discussion of Egypt's particular problems of spiraling population growth and the shift from rural to urban living. Among the highlights of the conference were: the urgency for a strong national housing policy; flexibility in standards and approaches, especially with regard to rural vs. urban solutions; first-priority consideration of user needs and incorporation of tenant ideas on the solution and management of their own housing requirement; strong government interaction; and application of management techniques, including total life-cycle project management, which guide the units' ultimate success.

**PB-293 786/0** PC A13/MF A01  
Rubber Research Inst. of Sri Lanka, Agalawatta.  
**Journal of the Rubber Research Institute of Sri Lanka, Volume 54, Part 1, Number 1**  
1977, 280p  
Also pub. as ISSN 0035-9531. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Trees(Plants), \*Growth, \*Rubber industry, \*Meetings, \*Developing countries, Plant genetics, Elastomers, Production, Germination,

Planting, Harvesting, Indonesia, Malaysia, Cost analysis, Prices, Yield, Latex, Tables(Data), Tropical regions. Identifiers: Developing country application, \*Hevea.

This journal presents the conference proceedings of the Rubber Research Institute of Sri Lanka for the purpose of exchanging knowledge in the rapid advances being made in the field of rubber technology. The journal includes nineteen reports presented at the conference by those associated with the rubber industry. A list of references is provided with each report.

**PB-293 787/8** PC A12/MF A01  
Rubber Research Inst. of Sri Lanka, Agalawatta.  
**Journal of the Rubber Research Institute of Sri Lanka, Volume 54, Part 1, Number 2**  
1977, 254p  
Also pub. as ISSN 0035-9531. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Trees(Plants), \*Plant growth, \*Developing countries, \*Meetings, Production, Elastomers, Fertilizers, Phosphorus, Nitrogen, Plant diseases, Fungicides, Plant reproduction, Planting, Malaysia, Education. Identifiers: Developing country application, \*Hevea.

This journal is the second part of the conference proceedings of the Rubber Research Institute of Sri Lanka presented for the purpose of exchanging knowledge in the rapid advances being made in the field of rubber technology. Included in this journal are twenty reports presented at the conference by those associated with the rubber industry. Also included is a reference list with each report.

**PB-293 788/6** PC A05/MF A01  
Maryland Univ., College Park. International Rural Water Resources Development Lab.  
**Development and Testing of the Robovalve**  
Final rept.  
Yaron M. Sternberg, and Robert Knight. Jun 78, 76p  
Contract AID/ta-C-1461

Descriptors: \*Water supply, \*Valves, Fire hydrants, Faucets, Polyvinyl chloride, Seals(Stoppers), Diaphragms(Mechanics), Developing countries. Identifiers: Developing country application, \*Robovalves.

A new valve, Robovalve, has been developed and tested in the laboratory for wear and leakage. The Robovalve appears to be simple to operate, rugged, reliable with a minimum of moving parts, essentially leakproof, and capable of being manufactured locally. The experimental work and manufacturing of the Robovalve are described in this booklet. Also included are tables, figures, and appendices.

**PB-293 801/7** PC A03/MF A01  
Science and Education Administration, Beltsville, MD. Technical Information Systems.  
**Double Cropping and Interplanting, 1972-1977. Quick Bibliography Series**  
Charles N. Bebee. Apr 78, 33p Rept nos. NAL/BIBL-78/05, 928  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Planting, \*Farm crops, \*Bibliographies, \*Developing countries, Grain crops, Soybean plants, Vegetable crops, Leguminous plants, Fruit crops, Tropical regions, Grasses. Identifiers: Developing country application, \*Double cropping methods.

This bibliography contains 230 citations on Double Cropping and Interplanting covering the period 1972-1977. Copies of titles listed are available from the National Agricultural Library.

**PB-293 807/4** PC A16/MF A01  
National Inst. on Drug Abuse, Rockville, MD. Div. of Research.



**National Institute on Drug Abuse Research Monograph Series. The International Challenge of Drug Abuse**  
1978, 362p\* Rept nos. DHEW/PUB/ADM-78/654, RESEARCH MONOGRAPH SER-19

Descriptors: Foreign countries, Developing countries, Research, Mexico, Nigeria, United States, Iran, Burma, Indonesia, Cocaine, Pharmacology, Narcotics, Drug addiction, Drugs.  
Identifiers: World Health Organization, \*Drug abuse, Drug utilization, Bolivia, Cannabis, Marijuana, Drug treatment programs.

The International Challenge of Drug Abuse is a monograph based on papers presented at the World Psychiatric Association 1977 meeting in Honolulu. It focuses on the international problem of drug abuse including: changing patterns of use in key areas of the world; the biological basis of drug dependence; such new advances in chemotherapy as LAAM and the narcotic antagonist, naltrexone; new advances in endorphin research; and key therapeutic issues in developing countries. The emphasis is on emerging patterns of drug use, international aspects of research, and therapeutic issues of particular interest worldwide.

**PB-293 818/1** **PC A06/MF A01**  
Centro Internacional de Mejoramiento de Maiz y Trigo, Mexico City.  
**The Puebla Project, 1967-69. Progress Report of a Program to Rapidly Increase Corn Yields on Small Holdings**  
1969, 122p  
Sponsored in part by Ministry of Agriculture, Mexico City., Puebla State Government (Mexico), and Agency for International Development, Washington, DC.

Descriptors: \*Research projects, \*Corn plants, \*Developing countries, Yield, Production, Climate, Soil properties, Fertilizers, Cultivation, Marketing, Plant genetics, Mexico.  
Identifiers: Developing country application, Puebla Project.

This project had its origins in the concern for the need to develop a methodology for bringing about rapid yield increases among farmers currently producing near subsistence levels. This report has been prepared to provide as complete a picture as possible of what the Puebla Project is, the nature of the joint effort of those participating, and the social and economic implications of the progress achieved up to now.

**PB-293 820/7** **PC A03/MF A01**  
Council of State Governments, Lexington, KY.  
**Creating Jobs: Connecticut's Product Development Corporation**  
James E. Jarrett, and Benjamin J. Jones. Dec 78, 47p NSF/RA-780453  
Grant NSF-ISR75-21176

Descriptors: \*Product development, \*Financing, Connecticut, Corporations, Research, Capital, Inventions, Revenue, Sales, Royalties, Inventions, Marketing, Technology innovation, Cash flow, Employment, State government, Businesses, Expenses.  
Identifiers: \*Job development, \*Research and development, Joint ventures, Small businesses, State aid, Job creation.

The corporation's primary aim is job creation which occurs when products developed with state financial assistance subsequently are manufactured and sold. The corporation provides companies with risk capital for expenses associated with developing a new product, device, technique, or process which can be exploited commercially. In most situations, a private company incurs 40 percent of development costs and the Product Development Corporation supplies the remaining 60 percent. State funds may be expended only for costs associated with developing and exploiting specific inventions and products, not for operating expenses, basic research, equipment, land or buildings. Use of the corporation's funds in no way replaces private financing since state aid is provided only to companies which cannot reasonably obtain financing from commercial sources. During the corporation's three years of operation, approxi-

mately 1.3 million dollars has been invested in joint ventures with 18 Connecticut companies. For fiscal year 1979, royalties of 50 thousand dollars are anticipated while in fiscal year 1980, royalties are projected to increase severalfold. To date, only three ventures have been written off as failures. A product development corporation seems applicable to many states and is a promising device for stimulating economic activity and job creation.

**PB-293 821/5** **PC A05/MF A01**  
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.  
**A Demonstration Project to Establish a Technology Delivery System for Small and Medium-Sized Firms**  
Hardy S. Taylor, Ronald O. Lumpkin, and Sallie G. Daniell. Feb 79, 79p GIT-A-2030-F, EDA-79-076  
Grant EDA-99-06-09647

Descriptors: \*Businesses, \*Technology transfer, National government, Universities, Technical assistance, Information services, Research, Industries, Information systems, Coordination.  
Identifiers: \*Small businesses, National Technical Information Service, Demonstration projects, Research and development, Information centers.

The report discusses a technology transfer delivery system which links small and medium-sized firms to the base of technical knowledge and expertise represented by the National Technical Information Service and eight participating University Centers. Also included are recommendations for the appropriate mechanisms, procedures, and operational concepts that can be used in expanding its existing capabilities into a national system.

**PB-293 822/3** **PC A05/MF A01**  
Economic Research Service, Washington, DC.  
**Graphic Analysis: Applications in Agricultural Economics**  
Frederick V. Waugh. Nov 66, 82p Rept no. AGRICULTURE/HB-326  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Agricultural economics, \*Developing countries, Graphic methods, Trends, Seasonal variations, Prices, Beef cattle, Yield, Corn plants, Time series analysis, Frequency distribution, Regression analysis, Food consumption, Production, Demand(Economics), Imports.  
Identifiers: Developing country application.

This report describes the various types of graphic presentation in relation to agriculture information. The graphic tool is almost indispensable in preliminary analysis. One of the main ways to find out about these relationships is through graphics.

**PB-293 841/3** **PC A04/MF A01**  
Appropriate Technology Development Association, Lucknow (India).  
**Some Developments of Appropriate Technology for Improving Physical Amenities in Rural Homes**  
Case study series no. 2  
M. K. Garg. Feb 78, 69p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Community development, \*Houses, \*Rural areas, Improvement, Developing countries, Water supply, Drainage, Sanitation, Toilet facilities, Illuminating, India.  
Identifiers: Developing country application, Villages, Appropriate technology, Biogas.

In the state of Uttar Pradesh, work was done by the Planning Research & Action Institute for improving the rural technologies both for income generation and also in the field of community and home living. The booklet is a case study documenting the work done by the Institute in community and home living technologies.

**PB-293 844/7** **PC A04/MF A01**  
Appropriate Technology Development Association, Lucknow (India).

**The Development of an Appropriate Technology for Decentralised Pottery Industry in Rural India**

Case study series no. 1  
M. K. Garg. 1965, 73p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Pottery, \*Industries, Clays, Processing, Forming techniques, Coloring, Tableware, Rural areas, Technical assistance, Developing countries, India.  
Identifiers: Developing country application, Villages, Appropriate technology.

The study is based upon the author's work undertaken in the service of the Planning Research and Action Institute and the Department of Industries of the government of Uttar Pradesh. It is published in the interest of promoting decentralized small scale industries throughout India and the world.

**PB-293 845/4** **PC A04/MF A01**  
Volunteers for International Technical Assistance, Inc., Schenectady, NY.  
**Manuel Pratique de l'Equipment Rural (V): Amenagement du Foyer (Village Technology Handbook: Home Improvement and Communications)**  
Jun 63, 74p

Descriptors: \*Houses, Improvement, Stoves, Ovens, Furniture, Bedding equipment, Sewing machines, Pottery, Developing countries, Technical assistance.  
Identifiers: Developing country application, Self help, Villages.

This is the fifth of five books teaching methods to improve one's standard of living through self-help methods. This volume deals with home improvement (includes kitchen stoves, outside ovens, how to make soap at home, low cost stackable beds, locally made mattresses, potter's wheel sewing machine drives, small kilns, and salt glazes for pottery) and communications (includes inexpensive rubber cement, flashlight slide projectors, gelatin duplicators, paper stencils, and silk screen paint). Tables of metric and English measure conversions are included.

**PB-293 846/2** **PC A03/MF A01**  
American Council on Education, Washington, DC.  
Higher Education Panel.  
**Scientific and Technical Cooperation with Developing Countries, 1977-78**  
Final rept.  
Frank J. Atelsek, and Irene L. Gomberg. Aug 78, 35p Rept no. HEP-40  
Grant NSF-SRS77-17251

Descriptors: \*Students, \*Technical assistance, \*Cooperation, \*Developing countries, Education, Universities, International relations, Financing, Federal assistance programs, Engineering, Health, Medical personnel, Management, Questionnaires, Surveys.  
Identifiers: \*Foreign students, Medical education, Health occupations education, Business administration, Science curriculum, Scientific personnel, Student financial aid.

The report presents survey data on nonimmigrant students from developing countries who were enrolled in postsecondary education in the United States and on U.S. faculty who were involved in cooperative activities financed in part with U.S. funds during the 1977-78 academic year. The survey was conducted by means of a questionnaire sent to 236 doctorate-granting institutions. Three fields were covered: science and engineering, health, and business management. Questionnaires asked for information on the numbers of nonimmigrant students studying at the undergraduate, post-baccalaureate, and postdoctoral levels and on the number of such students who received direct U.S. support. The survey included cooperative activities carried out by U.S. faculty members with developing countries.

**PB-293 864/5** **PC A07/MF A01**  
Agency for International Development, Washington, DC.



## L'Engraissement et L'Exploitation des Bovins de Boucherie (The Feeding and Management of Beef Cattle)

Hudson G. Reynolds, R. L. Davis, and W. F. Edgerley. 1978, 128p  
Sponsored in part by International Development, Washington, DC.

Descriptors: \*Animal husbandry, \*Beef cattle, \*Developing countries, Manuals, Forage grasses, Weight(Mass), Feeding stuffs, Nutritive value, Hormones, Quality, Fences, Silos, Equipment.  
Identifiers: Developing country application.

This booklet outlines all necessary considerations for the management of a beef herd. The pasture is viewed in light of climate, vegetation, cultivating forage, season, wind breaks, load per unit area, rodents and rabbits, watering, seasonal pastures, watering, subdividing lots, destroying shrubs, re-seeding, and exploitation of herbs and shrubs. Fattening the animals is studied looking at sex, age, weight, and quality of the animal, storage of forage, nutritive requirements, rations, hormones, forage preparation, and balancing rations. Equipment such as fences, silos, corrals, shades, road grates, and back-scratchers is covered. Dehorning, castration, and branding are also discussed.

## PB-293 865/2 PC A03/MF A01

National Research Council, Washington, DC.  
**Besoins Nutritifs de la Volaille (Nutrient Requirements of Poultry)**  
1966, 41p Rept no. PUB-1345  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Animal nutrition, \*Poultry, \*Developing countries, Nutritional requirements, Chickens, Turkeys, Vitamins, Vitamin deficiencies, Feeding stuffs.  
Identifiers: Developing country application.

This booklet provides a chart of the various nutritional requirements of chickens and turkeys at different ages as well as layers, and explains the different symptoms of nutritional deficiency for each of nineteen vitamins and minerals. The study then provides charts of food requirements to profitably raise poultry and the daily nutritive requirements for poultry of different weights.

## PB-293 866/0 PC A05/MF A01

Department of Agriculture Extension Service, Washington, DC.  
**Extension Teaching Methods and Other Factors that Influence Adoption of Agricultural and Home Economics Practices**  
Meredith C. Wilson, and Gladys Gallup. May 54, 87p Rept no. EXTENSION/CIRC-495  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Education, \*Agriculture, \*Methodology, Farm management, Rural sociology, Rural areas, Learning, Instructional materials, Leadership, Instructors.  
Identifiers: \*Rural extension, \*Teaching methods, Rural population, Curriculum, Developing country application.

The bulletin is intended primarily as a reference manual for those who are concerned with the improvement in the use of extension teaching methods. The essential steps in the adult learning and teaching process are outlined. Important factors which affect the adoption of improved farm and home practices are discussed. Various teaching methods are compared on the basis of relative effectiveness and extent of use. Essential elements, principal advantages, and limitations are identified.

## PB-293 867/8 PC A04/MF A01

Forest Products Lab., Madison, WI.  
**Exploitations Agricoles: Preservation des Po-teaux de Cloture et des Bois de Construction (Preservative Treatment of Fence Posts and Farm Timbers)**  
Oscar Blew, Jr. and Francis J. Champion. 1978, 63p Rept no. FARMERS/BULL-2049

Descriptors: \*Fences, \*Wood preservatives, \*Agriculture, Buildings, Termites, Decomposition, Creosote, Phenols, Naphthenates, Soaking, Maintenance.

Identifiers: Developing country application.

A cross-section of various chemical products and treatments to protect fences and buildings is presented here. Specifically, decomposition and insect damage are explained with a view to treatment. Pressure treatment of posts, hot and cold baths of preservative oils, soaking in cold baths, quick treatments, and treatments of low initial costs are all reviewed. Properties and use of more than a dozen treatment agents are described. Maintenance of posts after treatment is detailed, and other uses of wood in agriculture such as bridges and silos are studied.

## PB-293 868/6 PC A08/MF A01

Department of Health, Education, and Welfare, Washington, DC.  
**Puericulture: Les Soins aux Bebes (Infant Care)**  
Laura L. Dittman. 1963, 155p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: Humans, Medical services, Nutrition, Diseases, Preventive medicine.  
Identifiers: Developing country application, \*Infant health care, Mothers.

The book explains how a mother can best take care of her baby from birth to the end of its first year. Topics covered include the importance of regularly consulting a doctor, preventing sibling rivalry, obtaining a birth certificate, and general care (breast feeding, nourishment for the mother, clothing, bedding, sickness, and grooming). Special chapters are devoted to overseeing new developments from the first to the fourth, the fourth to the eighth, and the eighth to the twelfth months. Two extensive annexes offer special counsel on special problems such as premature birth, vaccinations, poisons, and specific maladies; and nourishment.

## PB-293 869/4 PC A05/MF A01

American Water Works Association, New York.  
**Distribution des Eaux: Le Calcul des Prix (Water Rates Manual)**  
Technical series rept. no. 2.  
1964, 78p

Descriptors: \*Cost analysis, \*Water distribution, \*Developing countries, Manuals, Prices, Water services, Expenses, Taxes.  
Identifiers: Developing country application, Water costs, \*Water rates.

This is the first of a series of four books that offer developing countries a guide to establishing a water distribution service. This book covers how to determine the proper price scale for the distribution of water. The cost price of the service, expenses, cost and expense distribution, and normal subscription rates are covered. Annexes study prior tariffs, rents, insurance, and fire protection.

## PB-293 870/2 PC A03/MF A01

Agricultural Research Service, Washington, DC.  
**L'Abattage des Boeufs a la Ferme (Slaughtering, Cutting, and Processing Beef on the Farm)**  
Richard L. Hiner. 1978, 48p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Beef, \*Food processing, Manuals, Freezing, Cutting, Cleaning, Separation, Meat, Equipment.  
Identifiers: Developing country application, Slaughtering.

This handbook for beef slaughtering and processing covers the entire procedure from handling and care of the animal before slaughtering to freezing, salting, drying, or smoking the beef. Topics covered include equipment, felling the animal, bleeding and skinning, opening the carcass, hoisting, cleaning, separating and examining the carcass, the offal, refrigeration, dissecting and rendering the meat.

## PB-293 872/8 PC A04/MF A01

Agricultural Research Service, Beltsville, MD.  
Animal Disease and Parasite Research Div.

## Parasites Internes du Porc (Internal Parasites of Swine)

1967, 63p Rept no. FARMERS/BULL-1787

Descriptors: \*Parasites, \*Swine, Preventive medicine, Therapy, Livestock, Domestic animals, Protozoa, Trematoda, Nematoda, Worms.  
Identifiers: Developing country application, Cestoda.

The book presents a thorough study of the general effects of internal parasites, preventive measures, and treatment for the elimination of parasites. Four separate chapters are devoted to Protozoa, Trematodes, Cestodes, and Nematodes; in all seventeen separate varieties of parasites are discussed. A resume of preventive measures is included.

## PB-293 873/6 PC A04/MF A01

Small Business Administration, Washington, DC.  
**Petite Entreprise: La Conception des Produits (Design Is Your Business)**  
Mar 63, 64p Rept no. SMALL BUSINESS MANAGEMENT SER-10

Descriptors: \*Product development, \*Production management, Decisionmaking, Coordination, Manufacturing, Packaging, Sales management, Marketing, Production engineering, Engineers, Design criteria, Consulting services.  
Identifiers: \*Design preferences, Developing country application.

Product design is studied in light of product manufacture, packaging, and sales. The coordination of product design and packaging as well as using the services of a consulting engineer are covered, but the businessman's final responsibility for design decisions over the consulting engineer is stressed. Essential principles of design policy are outlined and a short bibliography is included.

## PB-293 874/4 PC A05/MF A01

Agricultural Research Service, Beltsville, MD.  
Animal Disease and Parasite Research Div.  
**Les Maladies Parasitaires du Mouton (Parasites and Parasitic Diseases of Sheep)**  
J. T. Lucker, and A. O. Foster. 1978, 76p Rept no. FARMERS/BULL-1330

Descriptors: \*Parasites, \*Parasitic diseases, \*Sheep, Signs and symptoms, Life cycles, Therapy, Preventive medicine, Sites.  
Identifiers: Developing country application.

Sheep are extremely susceptible to parasitic attacks. This book details the likely locations, appearance, symptoms, life cycle, and methods of treatment and prevention of infestations of both internal and external parasites of sheep. Thirty-nine different species or genera are studied and a list of common and scientific names of each parasite covered is included.

## PB-293 876/9 PC A02/MF A01

Cornell Univ., Ithaca, NY. Dept. of Agronomy.  
**Fertilizacion con Nitrogeno en los Tropicos Humedos (Nitrogen Fertilization in the Humid Tropics)**  
Richard H. Fox. 1974, 19p Rept no. 72-17  
Prepared in cooperation with Puerto Rico Univ., Rio Piedras., and Agency for International Development, Washington, DC.

Descriptors: \*Fertilizers, \*Fertilizing, \*Tropical regions, \*Developing countries, Nitrogen, Soil properties, Urea, Ammonium sulfate, Planting, Puerto Rico, Africa, Latin America.  
Identifiers: Developing country application.

In the humid tropics it is possible to have a healthy and abundant crop of non-leguminous plants only with the application of Nitrogen (N) fertilizer to the soil. Although all soil contains certain levels of organic N (amounts varying in different areas), more may be necessary. This amount will depend on the N level present, the soil's humidity, and the speed of the absorption process. The principal source of N fertilizer in Latin America, as in Africa, is derived from ammonium sulfate, (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>, although the acid residue; the high cost of transportation in relation to the amount of N received; and the low content of N in the ammonium sulfate are definite de-



## APPROPRIATE TECHNOLOGY ABSTRACTS

terrents to using this source. Urea, CO (NH<sub>2</sub>)<sub>2</sub>, having a much higher content of N, thereby being more cost effective in relation to transportation, is difficult to handle because of its hygroscopicity. Urea is most effective when applied after planting. Charts/tables showing N/soil experiments are included along with an extensive bibliography.

**PB-293 916/3** PC A03/MF A01  
Department of Agriculture Extension Service, Washington, DC.  
**Vulgarisation Agricole: La Planification (Extension Looks at Program Planning)**  
1966, 32p Rept no. EXTENSION/CIRC-478

Descriptors: \*Agricultural economics, Handbooks, Project planning, Organizations, Personnel, Objectives, History.  
Identifiers: Developing country application, \*Agriculture Extension Service.

Designed specifically for accountable managers of agricultural extension programs, this handbook covers the history, theory, and practice of extension services. Inspectors, specialists, and other groups and organizations must be planned for to make the system work. The necessity of accommodating the program to the regional sociological and other conditions is stressed, and the creation and function of the program broken down into stages for easy understanding. The important factors of planning such as administrative subsidy and public comprehension are covered, and follow-up actions explained.

**PB-293 917/1** PC A04/MF A01  
Design Alternatives, Inc., Washington, DC.  
**Save Energy: Save Money**  
Eugene Eccli, and Sandra Fulton Eccli. Aug 77, 52p  
Sponsored in part by Agency for International Development, Washington, DC., and National Center for Appropriate Technology, Butte, MT.

Descriptors: \*Heating, \*Houses, Improvement, Savings, Cost control, Windows, Weatherstripping, Doors, Floors, Carpets, Furnaces, Stoves, Water heaters, Developing countries.  
Identifiers: Appropriate technology, Developing country application.

Large savings can be made when people become aware of the problems of home heating and some low-cost ways of solving them. The booklet looks at the most common and severe problems. Directions are given for ways to save money which you can apply yourself. These are practical suggestions which cost little and can help right away.

**PB-293 919/7** PC A03/MF A01  
Economic Research Service, Washington, DC.  
Natural Resource Economics Div.  
**Trade-Offs Between Farm Income and Selected Environmental Indicators: A Case Study of Soil Loss, Fertilizer, and Land Use Constraints**  
Technical bulletin  
Aug 76, 33p Rept no. TB-1550

Descriptors: \*Income, \*Agricultural economics, \*Farms, Mathematical models, Linear programming, Constraints, Soil erosion, Fertilizers, Land use, Flood control, Yield, Farm crops, Economic impact, Budgeting, Revenue, Government policies.  
Identifiers: Developing country application, Crop rotation, Tradeoffs, Environmental quality.

Changes in farm income associated with alternative restrictions on soil loss, fertilizer use, and the land use mix are analyzed. A linear programming model is used to estimate the effects of the restrictions, which were developed as indicators of environmental quality. Effects of a partial flood control program on farm income and the environmental quality indicators are also examined. Under conditions assumed in this analysis, restrictions on fertilizer use reduce net farm income more than constraints on either soil loss or the land use mix. Soil loss constraints reduce net revenue and fertilizer use while increasing the diversity of land use. Constraints on the land use mix reduce net revenue and fertilizer use. Flood retarding structures mitigate revenue losses only slightly and do not significantly

cantly change effects produced by environmental constraints. Public policies requiring lower erosion rates, reduced fertilizer use, or increased diversity of land use could affect rural resources and food and fiber production. Achieving any of those environmental changes has accompanying trade-offs in farm income.

**PB-293 921/3** PC A03/MF A01  
Agency for International Development, Washington, DC. Office of Agriculture.  
**Improving Farm Production in Tropical and Sub-Tropical Regions of Limited Rainfall**  
Technical series bulletin.  
Jun 73, 28p Rept no. TSB-4

Descriptors: \*Water conservation, \*Tropical regions, \*Farm crops, \*Developing countries, Arid land, Production, Rainfall intensity, Soil water, Water supply, Terracing, Precipitation (Meteorology), Water consumption, Soil fertility, Forage crops, Grasses.  
Identifiers: Developing country application, Crop rotation.

The report describes farming systems that should aid in making the most effective use of available moisture in those developing countries that have limited annual precipitation.

**PB-293 955/1** PC A05/MF A01  
General Accounting Office, Washington, DC. International Div.  
**Efforts to Improve Management of U.S. Foreign Aid - Changes Made and Changes Needed**  
29 Mar 79, 79p Rept no. ID-79-14

Descriptors: \*Foreign aid, Management, Recommendations, Developing countries, National government.  
Identifiers: Agency for International Development.

Over the past 5 years, GAO and others have made a number of recommendations to improve those U.S. programs aimed at bettering the way of life in less developed countries. This followup report shows that AID has taken steps to improve program management but needs to do more in several areas.

**PB-293 984/1** PC A03/MF A01  
Agricultural Research Service, Washington, DC.  
**The Herringbone Milking System. Economic Appraisal, Labor Efficiency Analysis, and Adjustment Possibilities**  
Morris M. Lindsey. Sep 60, 35p Rept no. PRODUCTION RESEARCH-45

Descriptors: \*Agricultural economics, \*Dairy equipment, Performance evaluation, Design, Improvement, Dairy cattle, Cost analysis, Efficiency, Comparison, Farm buildings, Manpower.  
Identifiers: Developing country application, Herringbone milking system.

One of the more important new developments which seem to hold promise for greater efficiency in dairy farming is the herringbone milking system. This system combines well with such modern improvements as loose housing of dairy cows, pipeline milking, and bulk handling of feed and milk. In this report, new information on the herringbone milking system has been brought together and analyzed. The herringbone is compared with other milking systems for different farm situations, and its possible impact on dairy farming is considered. The results should be of interest to dairy farmers who are considering changes in their milking systems, particularly those who are thinking also of expanding the size of their herds.

**PB-293 989/0** PC A05/MF A01  
Agency for International Development, Washington, DC.  
**Institution Building: Incidents, Ideas, and Applications. An Experimental Guidebook in Scholar Practitioner Communication**  
Final rept.  
Richard L. Duncan. 25 Mar 75, 80p  
Contract AID/ta-C-1069

Descriptors: \*Organization theory, \*Decision making, Research, Social sciences, Leadership,

Resource allocation, Education, Culture (Social sciences), Planning, Coordination, Cooperation, Public relations, Objectives, Government policies, Services, Rural areas.  
Identifiers: \*Institutional role, Human resources, Case studies, Governmental structure, Organizational development, Developing country application.

The guidebook addresses the notions that the development process is not dull and that social science research results can be made intelligible to any development practitioner in a manner useful to decision making problems. It is composed of incidents drawn from actual cases of development put together in the form of composite cases; institution building perspectives on those cases; and checklists of items for consideration in institution building situations.

**PB-294 000/5** PC A03/MF A01  
Science and Education Administration, Beltsville, MD. Technical Information Systems.  
**Quick Bibliography Series - Drip Irrigation, 1970-1977**  
Charles N. Bebee. Apr 78, 32p Rept no. NAL/BIBL-78/08  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Irrigation, \*Bibliographies, Design, Vegetable crops, Farm crops, Bacteria, Equipment, Fruit crops, Arid land.  
Identifiers: Developing country application, \*Drip irrigation.

This bibliography contains 265 citations on Drip Irrigation covering the period 1970-1977. Copies of titles listed are available from the National Agricultural Library.

**PB-294 018/7** PC A23/MF A01  
Inter-American Development Bank, Washington, DC.  
**Proceedings of the Seminar on Agricultural Policy: A Limiting Factor in the Development Process Held at Washington, DC. on March 17-21, 1975**  
11 Aug 75, 528p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Agriculture, \*Developing countries, \*Government policies, Agricultural economics, Livestock, Animal husbandry, Finance, Food supply, Food consumption, Prices, Farm management, Rural areas, Industries, Technology.  
Identifiers: \*Agricultural production, Rural development, Developing country application, Industrialization, Handicrafts.

The seminar was designed to help institutions in the member countries develop and adopt suitable policies for formulating agricultural and livestock development programs and to seek a greater utilization of bank resources in meeting these objectives. More than 60 experts from the Inter-American Development Bank's 22 member countries in Latin America, as well as Canada and the United States participated in the seminar on agricultural policy. Participants were high-level professionals, most of whom hold key planning and executive posts in their respective Governments, as well as 20 observers from international and other organizations.

**PB-294 021/1** PC A07/MF A01  
Hawaii Univ., Honolulu. Cooperative Extension Service.  
**Strategies for Improving Small Farmer Development in the Tropics**  
May 77, 146p Rept no. MPUB-152  
Contract ARS-12-14-5001-88  
Proceedings of Workshop, Held at the University of Hawaii, Honolulu on May 23-26, 1977. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Agricultural economics, \*Farms, \*Tropical regions, \*Developing countries, \*Meetings, Education, Government policies, Rural areas.  
Identifiers: Developing country application, \*Small farms.



The definition of a 'Small Farmer' in this report is grouped as the rural disadvantaged with little or no access to political power, institutional services, full employment, educational opportunities, societal bae, and amenities available to some other segments of the non-farm population. This workshop was devoted to working sessions in developing outreach strategies for the small farmer. Development schemes and case studies were presented and discussed by each of the participants but no consensus unanimity in program approach was reached.

**PB-294 030/2** **PC A15/MF A01**  
Design Alternatives, Inc., Washington, DC.  
**Proceedings of Workshop on Appropriate Technology Held January 23-25, 1978**  
Final rept.  
1979, 349p NSF/RA-790002  
Contract NSF-C-ERS77-21824

Descriptors: \*Research management, \*Meetings, Technology assessment, Planning, Guidelines, Policies, Decision making, Problem solving, Management, Technology transfer, Recommendations.  
Identifiers: \*Appropriate technology, Technology utilization.

The purpose of the project was to convene a workshop of people interested in appropriate technology to examine and document locally-focused issues in this field, and to contribute recommendations for a research agenda and program guidelines which could be considered in planning a distinct research program in appropriate technology. For the purposes of this report, appropriate technology is defined as a socio-technical process which encompasses technology design, assessment, and use. This process seeks to optimize solutions, wherever possible, through reliance on local problem-solving capabilities as well as sensitivity to environmental and cultural impacts. Information about the background and purposes of the project, including the rationale for a research program in appropriate technology, the research agenda and program development guidelines is presented. Background information about the issues examined during the project including copies of the project overview and overview of workshop events is given. The document also contains the 25 final papers written by workshop facilitators and participants, as well as other documentation of the ideas and recommendations made by those who attended the workshop. The agenda recommends three main research modes; socio-technical systems research, policy research, and technology transfer research.

**PB-294 035/1** **PC A22/MF A01**  
Development Alternatives, Inc., Washington, DC.  
**Strategies for Small Farmer Development: An Empirical Study of Rural Development Projects. Volume I**  
Final rept.  
Elliott R. Morss, John K. Hatch, Donald R. Mickelwait, and Charles F. Sweet. May 75, 513p  
Contract AID/CM/ta-C-73-41

Descriptors: \*Farm management, Developing countries, Productivity, Personnel development, Rural areas, Project planning, Models, Farm crops, Cooperation.  
Identifiers: Developing country application.

The purpose of this report is to provide information on what can be done to increase the well-being and productivity of the small farmer in the Third World so as to become self-sustaining. The volume is divided into five chapters with the following topics: (1) research and focus; (2) project success; (3) local action; (4) project components for small farmer development; and (5) summary of findings and their implications for AID and other major donors. Three appendices cover methodology; information systems to support rural development projects; and implication of the findings for future research.

**PB-294 036/9** **PC A19/MF A01**  
Development Alternatives, Inc., Washington, DC.  
Agency for International Development, Washington, DC.

**Strategies for Small Farmer Development: An Empirical Study of Rural Development Projects. Volume II. Case Studies**  
Charles F. Sweet, Elliott R. Morss, John K. Hatch, and Donald R. Mickelwait. May 75, 443p  
Contract AID/CM/ta-C-73-41

Descriptors: \*Farm management, \*Project planning, Productivity, Developing countries, Rural areas, Models, Farm crops, Cooperation.

This document is a complement to the analysis in Volume I. It is comprised of 36 write-ups of the projects studied.

**PB-294 067/4** **PC A08/MF A01**  
Agency for International Development, Washington, DC. Office of Development Administration.  
**Directory of Resources for Project Management Assistance**  
Hyde G. Buller. Aug 75, 171p

Descriptors: \*Project management, \*Technical assistance, \*Organizations, \*Directories, United States, Consulting services, Education, Research, Experience, Descriptions, Developing countries, Economic development, Services, Objectives, Information services.  
Identifiers: Developing country application, Training, Information sources.

The directory describes resources available in the United States that may provide assistance in planning and implementing development projects: training, advisory, and research services. The document is not a complete compendium of U.S. firms and organizations with strong capabilities for project management work in the less developed countries, but is one source of information.

**PB-294 068/2** **PC A06/MF A01**  
Economic Research Service, Washington, DC.  
**Manual for Agricultural Capital Project Analysis**  
David W. Brown. Feb 74, 107p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Agriculture, \*Projects, \*Benefit cost analysis, Developing countries, Agricultural economics, Capital, Financial management, Investments, Government policies, Economic analysis, Planning, Forecasting, Yield, Earnings, Farm management, Rural areas, Agricultural engineering, Manuals.  
Identifiers: Developing country application.

The manual was prepared for planners, officials, and other key professionals of developing countries. It deals with actual agricultural projects, linkages of projects to overall economic development, information gathering, and project implementation. Concepts and methods for conducting benefit cost analysis are discussed.

**PB-294 095/5** **PC A06/MF A01**  
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.  
**African Rural Employment Research Network - The Evolution of Alternative Rural Development Strategies in Ethiopia: Implications for Employment and Income Distribution**  
African rural employment study  
Tasfai Teclé. 1975, 123 Rept no. AREP-12  
Contract AID/csd-3625  
Prepared in cooperation with Addis Ababa Univ. (Ethiopia). Inst. of Development Research.

Descriptors: \*Employment, \*Income, \*Rural areas, \*Ethiopia, Evaluation, Rural sociology, Economic development, Regional planning, Agricultural economics, Farm management, Credit, Organization theory, Resource allocation, Production.  
Identifiers: \*Rural development, Program evaluation, Job development, Developing country application.

The report documents the evolution and performance of Ethiopia's rural development programs and draws lessons for future programs. Ethiopia's government has instituted dual equity/production programs which are designed to improve the lives of the masses in the countryside.

**PB-294 127/6** **PC A03/MF A01**  
Winrock International Livestock Research and Training Center, Morrilton, AR.  
**Proceedings of a Workshop on the Role of Sheep and Goats in Agricultural Development Held at Morrilton, Arkansas on November 15-17, 1976**  
E. A. Oltenacu, and A. Martinez. Nov 76, 45p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Sheep, \*Goats, \*Agricultural economics, \*Meetings, \*Developing countries, Production, Meat, Milk, Fibers, Animal diseases, Parasites, Research projects, Attitudes, Constraints, Improvement.  
Identifiers: Developing country application.

The objectives of this project include: (1) documentation of production coefficients for sheep and goat systems, (2) identification of constraints and potentials for production and marketing systems, (3) assessment of research, training and development programs involving sheep and goats, (4) characterization of prevailing attitudes of policy makers and planners toward sheep and goats, and (5) suggestion of projects and locations for sheep and goat improvement projects from which important social and economic benefits are likely to result. Participants in this workshop included international authorities on sheep and goat production and on agricultural development.

**PB-294 130/0** **PC A07/MF A01**  
International Rice Research Inst., Los Banos, Laguna (Philippines).  
**Training Manual for Rice Production**  
Vo-Tong Xuan, and Vernon E. Ross. 1976, 147p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Production, \*Rice plants, \*Developing countries, Manuals, Cultivation, Plows, Levees, Maintenance, Seeds, Germination, Dormancy, Nitric acid, Planting, Fertilizers, Weed control, Insect control, Plant diseases, Harvesting, Drying, Storage.  
Identifiers: Developing country application.

This manual has been developed to serve those involved in teaching the new rice technology. In addition, it can serve scientists and farmers alike, as a reliable guide to the performance of the tasks involved in producing irrigated rice. The manual contains all the lessons on the skills of producing rice.

**PB-294 131/8** **PC A05/MF A01**  
Agency for International Development, Washington, DC. Bureau for Technical Assistance.  
**Regional Development: A Review of the State-of-the-Art**  
James C. Miller. Aug 74, 80p

Descriptors: \*Regional planning, \*Economic development, \*Developing countries, Rural areas, Urban areas, Urban development, Growth, Centers, Models, Development, Coordination, Organizing, Management, Employment, Productivity, Planning.  
Identifiers: Developing country application, \*Regional development.

A major impediment to the development and growth of the less developed nations is the deficient spatial organization of these nations, i.e., the absence of hierarchical system of metropoli, cities, towns, and smaller central places through which growth and development impulses are transmitted. The first part of this study discusses the theoretical underpinnings of this notion, drawing together and synthesizing elements of economic development theory, central place theory, location theory, and information theory into a model of the spatial diffusion of economic growth. Next, implications are drawn from the model concerning the deficiencies of spatial organization of developing countries, and several strategies aimed at correcting these deficiencies are discussed. An overview of regional development planning experiences in developed and developing countries is then undertaken, and several conclusions complete the study.



**PB-294 137/5** PC A11/MF A01  
Winrock International Livestock Research and Training Center, Morrilton, AR.  
**The Role of Sheep and Goats in Agricultural Development. A State of the Arts Study**  
Aug 77, 230p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Sheep, \*Goats, \*Agricultural economics, \*Reviews, \*Developing countries, Production, Tropical regions, Proteins, Meat, Milk, Wool, Demand(Economics), Government policies, North Africa, Middle East.  
Identifiers: Developing country application.

The approximately 1.5 billion sheep and goats of the world are a major resource for feeding and clothing mankind. The current role of sheep and goats in developing countries ranges from a very minor level of production in some of the countries in the wet tropics to being the principal source of animal protein in certain North African and Middle Eastern nations. The lack of understanding of the roles of sheep and goats has generally resulted in their being ignored as a part of the sustenance and development cycle for small farmers and pastoralists. It is hoped that this report will provide the stimulus for attainment of the necessary understanding to determine the proper role for sheep and goats in future agricultural development efforts.

**PB-294 138/3** PC A03/MF A01  
Economic Research Service, Washington, DC.  
**Economics of Protein Improvement Programs in the Lower Income Countries**  
Foreign economic development rept.  
Lyle P. Schertz. Jul 71, 43p Rept no. FEDR-11  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Proteins, \*Grain crops, \*Agricultural economics, \*Developing countries, Improvement, Sources, Human nutrition, Income, Food consumption, Plant genetics, Cost analysis, Foreign countries, Brazil, Pakistan, Technical assistance.  
Identifiers: Developing country application.

This paper presents an overview of the world protein problem and some major economic considerations important to nutrition improvement programs. It discusses sources and uses of protein, the role of income, and benefit-cost dimensions of various strategies aimed at improving adequacy of protein consumption in lower income countries.

**PB-294 139/1** PC A03/MF A01  
Institucion No Lucrativa Al Servicio de la Iniciativa Privada, San Pedro (Argentina).  
**Design of a Factory for the Productivity of Tomato Paste**  
Ing. Walter Huppke, Guillermo Medina Santos, and S. E. White. 1962, 32p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Food processing, \*Tomatoes, \*Industrial plants, Machinery, Sanitation, Production capacity, Production methods, Cost estimates, Farm processing, Developing countries, Operating costs, Labor estimates, Industrial management, Production planning, Technical assistance.  
Identifiers: Developing country application.

The report is a complete study of the various factors which enter into the economic aspects of a tomato products industry.

**PB-294 140/9** PC A08/MF A01  
Little (Arthur D.), Inc., Cambridge, MA.  
**Chemical Processing, An Operation Manual for Cooperative Program Use**  
Jun 57, 164p  
Sponsored in part by Agency for International Development, Washington, DC. Communications Resources Div.

Descriptors: \*Chemical industry, \*Manuals, Design criteria, Process charting, Equipment, Dyers, Evaporators, Pressure filters, Heat exchangers, Cost analysis, Rotary filters, Management planning, Performance evaluation.

Identifiers: Developing country application.

This manual describes some of the basic equipment for the establishment of chemical processing industries. Six types of equipment are described: dryers; evaporators; pressure filters; jacketed process vessels; heat exchangers; and rotary vacuum filters. The manual is designed as a guide for the operation of many of the more important chemical process systems, which are significant in a growing industrial economy. It should be of help in the planning stages of almost any process industry.

**PB-294 146/6** PC A08/MF A01  
Cornell Univ., Ithaca, NY. Rural Development Committee.  
**Local Organization for Rural Development: Analysis of Asian Experience**  
Special series on rural local government  
Norman Uphoff, and Milton J. Esman. Nov 74, 174p Rept no. RLG-19

Descriptors: \*Organization theory, \*Local government, \*Rural areas, Employment, Economic development, Welfare, Income, Agricultural products, Productivity, Citizen participation, Population growth, Research, Yield, Services, Foreign countries.  
Identifiers: \*Rural development, \*Governmental structure, Asian studies, Institutional role, Developing country application.

The report analyzes and summarizes the findings of a study undertaken to clarify the role of rural local institutions in the rural development process. The study puts a special emphasis on agricultural productivity, income, local participation, and rural welfare. Development experiences in several Asian countries are examined.

**PB-294 147/4** PC A04/MF A01  
International Development Research Centre, Ottawa (Ontario).  
**Scientific and Technical Information in Pakistan. The Report of a Joint IDRC/UNDP Mission, October-November 1976**  
Nov 78, 64p  
Prepared in cooperation with United Nations Development Programme, New York. Sponsored in part by Agency for International Development, Washington, DC., and Pakistan Science Foundation, Islamabad.

Descriptors: \*Information systems, \*Pakistan, User needs, Information services, Decentralization(Dispersal), Information centers, Developing countries, Professional personnel, Librarians, National government, Cooperation.  
Identifiers: Developing country applications.

The Pakistan National Scientific Documentation Centre (PANSDOC), was established in 1957, with technical assistance from Unesco, to provide scientific workers and others with services such as the procurement of documents, compilation of bibliographies and translations. In the late sixties, a project was formulated to convert this group into a fully-fledged Pakistan Scientific and Technological Centre (PASTIC), and work on this expanded project was started in 1974. The PASTIC project was based on the concept of a centralized service, which was consistent with what was then being attempted by most developing nations. Pakistan organized a joint IDRC/UNDP Mission, consisting of experts from Unesco, IDRC and UNIDO, to conduct a detailed study of the S&T information needs in Pakistan and make recommendations on the future structure and development of a national S&T information network. A comprehensive report was produced based on a detailed analysis of the existing situation and anticipated future requirements. Since the contents of the report are relevant not only to Pakistan but to other developing countries faced with similar problems, it was decided to publish the mission report with IDRC assistance, for wider circulation.

**PB-294 184/7** PC A03/MF A01  
Science and Education Administration, Beltsville, MD. Technical Information Systems.

**Quick Bibliography Series: Training, Management and Evaluation of Extension Work, 1970 - 1978**

Nancy H. Lewis. Apr 78, 44p Rept no. NAL/BIBL-78/11  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Bibliographies, \*Education, \*Management, \*Evaluation, \*Agriculture, Leadership, Decision making, Motivation, Farm management, Agricultural economics, Agricultural engineering, Rural sociology.  
Identifiers: \*Rural extension, Training, Educational assessment, Developing country application.

The bibliography contains 278 citations on the training, management, and evaluation of extension work. The citations were taken from the Agricola data base.

**PB-294 217/5** PC A03/MF A01  
Virgin Islands Dept. of Conservation and Cultural Affairs, Charlotte Amalie, St. Thomas.  
**Demonstration of Virgin Islands Small Boat Fishing Techniques**  
Completion rept. Jul 75-Sep 78  
Susan E. Coleman, Joseph R. Sylvester, Joseph A. LaPlace, Ken Turbe, and Arthur E. Dammann. Mar 79, 33p NOAA-79030604

Descriptors: \*Fishing, \*Virgin Islands, \*Boats, Design, Traps, Nets, Operating costs, Construction materials, Performance evaluation.  
Identifiers: Dories.

Virgin Islands fishery development has centered on technological introduction and resource diversification. This report provides a descriptive study on the use of an easily constructed rough-water dory and assessment of its performance in local waters. This assessment took the form of simulated commercial fishing and explored a variety of fishing techniques to measure daily catch potential in local waters. The basic boat design was suitable to local rough water conditions but lacked sufficient working deck space. Lengthening the boat to 20 feet increased operating expenses. Subsequent shortening to 17 feet indicated that the most economical size may lie between 17 and 18 feet, with a 65-85 hp outboard motor. Gear loss and fuel were the major expense items. Traps, line fishing, gill nets, and bait nets produced more than 90% of the total catch.

**PB-294 218/3** PC A05/MF A01  
Wisconsin Univ. Extension, Madison. Sea Grant Advisory Services.  
**Perch Fingerling Production for Aquaculture**  
Richard W. Soderberg. 1978, 82p WIS/SG/AR-421, NOAA-79030201  
Proceedings of a Conference held at the University of Wisconsin on December 12, 1977.

Descriptors: \*Perch, \*Aquaculture, \*Meetings, Reproduction(Biology), Life cycles, Growth, Tanks(Containers), Fisheries, Temperature, Budgeting, Cost engineering, Reviews.  
Identifiers: \*Perca flavescens, Sea Grant program.

Perch fingerling production was the subject of a conference held at the University of Wisconsin on December 12, 1977. Because of their small market size and limited growth potential, perch aquaculture will be a fingerling-intensive proposition. Larger numbers of fingerlings will be required to produce a given weight of perch than for most other species being cultured. For this reason, purchased fingerlings become a major element in the cost of producing a pound of perch. From an economic standpoint, it is difficult to fit a five to 10 cent fingerling into the cost of producing a fish that will sell for 30 to 40 cents when grown out. The purpose of this conference is to present what is considered the state of the art in perch fingerling production to help reduce the cost of this element of perch aquaculture.

**PB-294 226/6** PC A25/MF A01  
Harvard Univ., Boston, MA. Graduate School of Business Administration.



## Agribusiness Management for Developing Countries with Special Reference to the Central American Fruit, Vegetable and Floriculture Export Industries

Ray A. Goldberg. 1973, 588p  
Contract AID/csd-3153

Descriptors: \*Commodity management, \*Exports, \*Developing countries, Agriculture, Education, Fruits, Vegetables, Plants(Botany), International trade, Market surveys, Consumption, Supply(Economics), Organization theory, Government policies, Transportation, Coordination.  
Identifiers: \*Agribusiness, Case studies, Commodity markets, Developing country application.

The purpose of the study is to provide a conceptual framework based on an agribusiness commodity system analysis that is believed to be useful to educators in Central America as they train future participants in Central American agribusiness. The chapter topics include: U.S. fruit and vegetable commodity system; the structure of the system; coordinating linkages between Central American exporters and the U.S. market for fruit and vegetables; Central American fruit and vegetable production for export; agribusiness education; and conclusions of the study. Included is a list of exhibits, a list of tables, and case studies.

## PB-294 233/2 PC A03/MF A01

Armstrong Cork Co., Lancaster, PA.  
**New Foreman Training Plan**  
Feb 54, 27p Rept no. TB-14  
Sponsored in part by International Cooperation Administration, Washington, DC. Office of Industrial Resources.

Descriptors: \*Management training, \*Supervisors, Personnel development, Leadership, Industrial training, Production management, Supervision, Industrial relations, Personnel management, Manufacturing, Job analysis.  
Identifiers: \*Supervisory training, On job training, Supplementary education, Developing country application.

The booklet is designed as a management tool for training new foreman. Procedures are provided for on-the-job training, plant supplementary training and production management courses.

## PB-294 234/0 PC A02/MF A01

Centro Cooperativo Tecnico Industrial, Tegucigalpa (Honduras).  
**A Proposed Factory in Honduras for the Processing of Pineapples and Other Tropical Fruits**  
Walter F. Huppke. 1965, 18p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Fruits, \*Food processing, \*Honduras, Food industry, Feasibility, Technology, Promotion, Developing countries, Technical assistance.  
Identifiers: Developing country application, \*Pineapples.

The purpose of the report is to present data regarding the pineapple industry in Honduras. This information should be an aid to investors to determine the feasibility of establishing a fruit processing industry.

## PB-294 235/7 PC A04/MF A01

Economic Research Service, Washington, DC.  
**Energy Use and Conservation in the Poultry and Egg Industry**  
George B. Rogers, Verel W. Benson, and Donald Van Dyne. Oct 76, 58p Rept no. USDA/AER-354  
Errata sheet inserted.

Descriptors: \*Fuel consumption, Electricity, Poultry, Eggs, Poultry houses, Marketing, Space heating, Illuminating, Ventilation, Industries.  
Identifiers: \*Energy consumption, \*Energy conservation, \*Poultry industry, Electric power consumption, Developing country application.

Estimates of energy use in the poultry and egg industry are discussed by commodity, type of fuel, season, and function. In 1974, the 146.5 trillion Btu's used in poultry production and marketing cost producers almost \$550 million. Although the

efficiency of energy use in this industry has increased in the last decade, energy conservation measures discussed in this report can yield further substantial savings. Development and implementation of new technologies may reduce the use of critical forms of energy in the future. This study is intended to provide a basis for further energy research in the poultry and egg industry and to serve as a prototype for similar energy studies on other agricultural industries.

## PB-294 237/3 PC A04/MF A01

Agricultural Research Service, Beltsville, MD.  
**Commercial Rabbit Raising**  
R. B. Casady, P. B. Sawin, and J. Van Dam. Oct 71, 73p Rept no. AGRICULTURE HANDBOOK-309  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Rabbits, \*Animal husbandry, Handbooks, Feeding stuffs, Buildings, Reproduction(Biology), Equipment, Marketing, Agricultural economics, Wool, Standards, Production, Sanitation.  
Identifiers: Developing country application.

This handbook was issued to help country agricultural agents, State colleges of agriculture, and the U.S. Department of Agriculture answer the many thousands of requests received each year from commercial and professional rabbit producers for information about rabbits.

## PB-294 238/1 PC A11/MF A01

Agency for International Development, Panama City (Panama).  
**Panamanian District: A Case Study in the Sociology of Development**  
James Wyche Green, and Jose Raul Garcia de Paredes. Jul 69, 229p

Descriptors: \*Economic development, \*Sociology, \*Panama, Agriculture, Livestock, Municipalities, Local government, Education, Health, Religions, Ethics, Community development, Social effect.  
Identifiers: \*Case studies, Governmental structure, Public education, Public health, Voluntary agencies, Developing country application.

The intent of the document is to derive from the study of Macaracas the most relevant generalizations for the development of all of the districts of Panama. The study includes the areas of agriculture and livestock, municipal government, public education, public health, other government offices, voluntary agencies, religion and morals, and community development. The document includes illustrations and annexes.

## PB-294 246/4 PC A03/MF A01

Farm Credit Administration, Washington, DC.  
**Le Systeme de Credit Agricole Cooperatif aux Etats-Unis (The Cooperative Farm Credit System)**  
Jan 61, 34p

Descriptors: \*Credit, \*Agriculture, \*Developing countries, Finance, Organization theory, Cooperation, Sources, History, Farm management, Financial management.  
Identifiers: \*Financial services, Loans, Developing country application.

The basic functions and organization of a farm credit system are outlined in this manual for developing countries. Detailed analysis is given for sources of agricultural credit, and a history of the U.S. Agricultural Credit Cooperative is given. The Cooperative's methods of response to the needs of its members is thoroughly explained.

## PB-294 262/1 PC A09/MF A01

Bangladesh National Scientific and Technical Documentation Centre, Dacca.  
**A Directory of Scientists and Technologists of Bangladesh**  
Ahsan A. Biswas. Feb 76, 200p Rept no. BANSDOC-BIBLIO-113  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Scientists, \*Bangladesh, \*Directories, Professional personnel, Engineers, Librarians, Instructors, Biographies.  
Identifiers: Developing country application.

This directory contains over 1500 entries of scientists and technologists in Bangladesh. Entries have been divided into 23 sections on a broad subject basis and have been arranged according to Universal Decimal Classification. Bibliographic data has been provided for each entry.

## PB-294 264/7 PC A09/MF A01

Bangladesh National Scientific and Technical Documentation Centre, Dacca.  
**Current Scientific and Technological Research Projects in the Universities and Research Institutions of Bangladesh**  
M. Q. Islam, M. O. Ghani, M. S. A. Khan, Nasera Begum, and Nasiba Khatun. 1978, 193p Rept no. BANSDOC-BIBLIO-135  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Research projects, \*Bangladesh, \*Directories, Universities, Agriculture, Social sciences, Medicine, Industries.  
Identifiers: Developing country application.

The directory is a comprehensive listing of the research activities of the Universities and Research Institutions of Bangladesh. Through this publication, a researcher can avoid duplication by being informed of the research presently being done or research that has been done by a particular agency on a particular problem or problems in the country of Bangladesh.

## PB-294 272/0 PC A02/MF A01

Agricultural Research Service, Beltsville, MD. Soil and Water Conservation Research Div.  
**Sprinkler Irrigation**  
Claude H. Pair. Nov 66, 10p Rept no. LEAFLET-476

Descriptors: \*Sprinkler irrigation, Manuals, Operations, Pipelines, Sprinklers, Design, Pumping stations, Maintenance, Portable equipment, Selection.  
Identifiers: Developing country application.

The operation of a sprinkler irrigation system is outlined in this pamphlet. Discussed are the parts of a system; factors to consider in choosing a system; system design; buying a system; and the operation and maintenance of a system.

## PB-294 283/7 PC A99/MF A01

Governmental Affairs Inst., Washington, DC. Agricultural Sector Implementation Project.  
**Managing Planned Agricultural Development**  
Albert Waterston, Wayne Weiss, and John L. Wilson. Aug 76, 622p  
Contract AID/csd-3650

Descriptors: \*Agriculture, \*Agricultural economics, \*Developing countries, Management, Rural areas, Economic development, Regional planning, Conflicts, Allocations, Demand(Economics), Marketing, Policies, Employment, Financing, Project planning, Constraints, Organizations, Education.  
Identifiers: Developing country application.

The prime objective of this report is to help bridge the gap between planners and farmers by providing information for improving the capabilities of those in the developing countries concerned with the planned development of the agriculture sector. Agricultural development is herein conceived as an essentially intra-sectoral activity which includes all services necessary to its promotion.

## PB-294 284/5 PC A04/MF A01

Agricultural Research Service, Washington, DC.  
**Maladies Communes et Parasites des Volailles (Communicable Diseases and Parasites of Chickens)**  
Marion M. Farr, and Edward E. Lund. 1962, 58p

Descriptors: \*Chickens, \*Poultry, \*Diseases, \*Parasites, Livestock, Domestic animals, Newcastle disease, Infectious diseases, Viral diseases,



Salmonella, Bacteria, Therapy, Signs and symptoms, Preventive medicine, Mites, Ticks, Worms, Lice, Animal husbandry, Veterinary medicine. Identifiers: Developing country application.

The booklet is a translation of eight English language pamphlets entitled: Newcastle Disease; Salmonella Infections in Poultry; Intestinal Coccidiosis of Chickens; Blackhead of Turkeys and Chickens; Poultry Mites; Fowl Tick; Tapeworms of Poultry; Chicken Lice. Each disease or affliction is explained by analyzing its life cycle, mode of transmission, internal and external symptoms, and methods of prevention and cure.

**PB-294 285/2** PC A05/MF A01  
Massachusetts Univ., Amherst. Dept. of Entomology and Plant Pathology.  
**L'Elevage des Abeilles (Beekeeping)**  
Frank R. Shaw. 1966, 81p

Descriptors: \*Bees, \*Production, Manuals, Insects, Harvesting, Animal diseases, Maintenance. Identifiers: Developing country application.

The composition and workings of a bee colony is explained in detail in this manual's introduction to make the necessity for proper maintenance of the colony understood. Chapters are devoted to the preparation of the annual chores, winter care, harvesting the honey, raising queen bees, bee diseases, and the production of honey in sections.

**PB-294 286/0** PC A08/MF A01  
Forest Service, Washington, DC.  
**Les Brise-Vent (Tree Windbreaks for the Central Great Plains)**  
Ralph A. Read. 1978, 159p

Descriptors: \*Farms, \*Trees(Plants), \*Windbreaks, Manuals, Wind velocity, Atmospheric temperature, Soil conservation, Farm crops, Protection, Livestock, Selection, Spacing. Identifiers: Developing country application.

Windbreaks can contribute greatly to soil conservation. This manual covers all aspects of effectively using windbreaks. The effects of a windbreak on the wind speed, temperature and humidity of the air and soil, and the properties of the soil are discussed as is its action on plants and animals. Different types of windbreaks are used for different purposes; mono- and polyvalent types are used for farms, fields, animals and buildings. This manual tells how to choose the proper type of tree, and how to space and plant them.

**PB-294 297/7** PC A16/MF A01  
Department of Agriculture, Washington, DC.  
**Manuel de Conservation du Sol (Soil Conservation Manual)**  
1950, 369p

Descriptors: \*Agriculture, \*Soil conservation, \*Developing countries, Manuals, Classifications, Forest land, Erosion control, Roads, Terracing, Cultivation, Grassland, Irrigation. Identifiers: Developing country application.

All aspects of soil conservation are thoroughly analyzed and explained in this report. Specific topics covered include: Classification of soils; prevention and rectification of ravines; the role of silviculture; erosion around roadways; terracing; crop rotation and alternation; cover crops; harvesting methods; methods for creating, managing, conserving and improving pastures; conservation of wildlife to prevent erosion; increasing water reserves; irrigation; and nurseries.

**PB-294 309/0** PC A03/MF A01  
PADCO, Inc., Washington, DC.  
**Guidelines for Formulating Projects to Benefit the Urban Poor in the Developing Countries. Volume I: Background, Goals and Project Opportunities**  
Apr 76, 47p  
Contract AID/ta-C-1107

Descriptors: \*Developing countries, \*Urban areas, \*Low income groups, Urban development, Population growth, Population migration, Unemployment,

Urban planning, Services, Households, Consumption, Assets, Credit, Demographic surveys, Unskilled workers, Economic analysis, Fiscal policies. Identifiers: \*Poverty programs, \*Poverty research, Developing country application.

Volume I reviews the scale of the urban poverty problem, identifies varieties and underlying causes of urban poverty and indicates the goals presumed for the undertaking of projects to benefit the urban poor.

**PB-294 310/8** PC A17/MF A01  
PADCO, Inc., Washington, DC.  
**Guidelines for Formulating Projects to Benefit the Urban Poor in the Developing Countries. Volume II: Guidelines for Project Selection, Summary Project Characteristics and Case Studies**  
Apr 76, 396p  
Contract AID/ta-C-1107

Descriptors: \*Developing countries, \*Urban areas, \*Low income groups, Urban development, Employment, Productivity, Finance, Urban planning, Services, Housing planning, Transportation, Education, Health, Water supply, Water treatment, Economic impact, Social effect, Land use. Identifiers: \*Poverty Programs, \*Poverty research, Developing country application.

Volume II identifies the role of projects in each sector in economic and social development together with the policy implications of such projects, describes the characteristics of projects likely to have high beneficial impact on urban poverty groups in the developing countries, identifies the other types of impact they are likely to involve and indicates complementary actions which may be necessary in undertaking them. Subject areas include: employment and productivity; water supply and sanitation; urban health services; urban education; housing; urban transportation; and urban management and finance.

**PB-294 311/6** PC A03/MF A01  
Ministry of Education and Culture, Rio de Janeiro (Brazil).  
**LeCaste-Croute Scolaire (School Lunch Booklet)**  
1963, 48p

Descriptors: \*Food services, Food preparation, Children, Students, Schools, Financing, Nutrition, Brazil, Food preservation, Distribution, Control. Identifiers: Developing country application, \*School lunch program.

Basic information on how to start a school lunch program in a school to guarantee children at least one balanced meal a day is provided by this book, written for the Brazilian school system. The program's purpose is explained, and details are given for understanding basic nutrition; food preparation; financing the program; personnel installations, and material needed; food preservation; preparing menus; distribution and control; and signs of undernourishment.

**PB-294 312/4** PC A02/MF A01  
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.  
**Establishing Savings and Loan Associations in Less Industrialized Countries**  
Ideas and methods exchange  
Roy J. Burroughs. Mar 67, 16p Rept no. IME-38  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Banks(Buildings), \*Developing countries, Banking business, Housing planning, Savings, Capital, Investments, Housing surveys, Operating costs, Interest, Budgeting. Identifiers: \*Savings and loan associations, Financial services, Developing country application, Loans, Mortgages.

The paper is for use in countries participating in the technical cooperation program. It is intended to describe the methods now used to establish savings and loan institutions in the United States.

**PB-294 344/7** PC A10/MF A01  
American Water Works Association, New York.  
**Distribution des Eaux: Les Relations Publiques (Silent Service is Not Enough)**  
Technical series rept. no. 4.  
1964, 206p

Descriptors: \*Public relations, \*Water distribution, Manuals, Water services, Publicity, Industrial relations, Education, Management. Identifiers: Developing country application.

This is the fourth of four books explaining how to run a water distribution system. Public relations is a key aspect of the overall system. The importance of it is explained and the best methods of establishing and maintaining good public relations is discussed including: Creating a public relations awareness in your employees; strengthening bonds with the agents of other public services; teaching about the water service in schools; using publicity to make words and actions known; using publicity agents; and the necessity of making a water service interesting and attractive.

**PB-294 366/0** PC A08/MF A01  
Children's Bureau, Washington, DC.  
**Puericulture: Votre Enfant de Un a Six Ans (Your Child from One to Six)**  
1978, 155p Rept no. PUB-30-1962  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Children, \*Infants, Infectious diseases, Preventive medicine. Identifiers: Developing country application, \*Health care, \*Child rearing.

This is the third of a series of three books on child rearing. In simple language, understandable to any basic French reader, practical information is given regarding the normal medical and psychological problems normally encountered when raising young children, including emergencies. A special chapter is devoted to special problems due to changing residence, hospital stays, and handicaps. A chart of the symptoms, incubation period, methods of prevention, duration, and treatment of more and less common contagious diseases is included.

**PB-294 410/6** PC A05/MF A01  
Agricultural Research Service, Washington, DC.  
**The Potato Industry in East Pakistan. Improving Seed Potato Multiplication and Storage**  
D. G. Dalrymple, and R. V. Akeley. May 68, 98p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Potatoes, \*Agricultural economics, \*Pakistan, Yield, Production, Horticulture, Fertilizers, Seeds, Imports, Food storage, Demand(Economics), Plant diseases, Viruses, Prices, Marketing, Nutrition, Food consumption. Identifiers: Developing country application.

Although the potato has been commercially cultivated for centuries in Europe and North America, it is evidently rather new to East Pakistan. One report indicates that it was first produced around 1930. Since then, production has expanded substantially and potatoes are now easily the most important vegetable crop. Present production and marketing methods will be discussed in the first part of this report. One of the major production problems faced in East Pakistan--and other tropical areas--is the difficulty of building up and maintaining good stock. This is, in part, traceable to the heavy year-round insect populations which spread potato viruses. A special problem in East Pakistan is related to topography: the country is almost entirely a low-lying delta and there is essentially no high land suitable for more conventional breeding and multiplication programs. One answer is to import new seed varieties each season. This process, however, takes scarce foreign exchange. A compromise method would be to import a limited amount of seed, multiply it, and then store it for distribution to farmers the following season. The latter method has been proposed for East Pakistan and is discussed in detail in the second portion of this report.



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**PB-294 411/4** PC A04/MF A01  
Economic Research Service, Washington, DC.  
**Leaf Protein Concentrate (PRO-XAN) from Alfalfa: An Economic Evaluation**  
Agricultural economic rept.  
C. J. Vosloh, Jr, R. H. Edwards, and R. V. Enochian. Sep 76, 59p Rept no. USDA/AER-346  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Proteins, \*Feeding stuffs, \*Agricultural economics, \*Economic analysis, Operating costs, Plant tissues, Extraction, Labor estimates, Equipment, Investments, Industrial plants, Distillation.

Identifiers: \*Pro-Xan process, Alfalfa, Developing country application, Wet methods.

Extraction of leaf protein concentrate (Pro-Xan) from alfalfa for use in various livestock feeds provides new investment opportunities under a wide variety of conditions. This report evaluates four systems for making this extraction and the effect of four variables on the annual rate of return on investment. The four systems differ in the method of expressing juice from the fresh alfalfa and the yield of Pro-Xan. The system in which the alfalfa is ground prior to pressing, and which has a Pro-Xan yield of 12 percent, had the highest rate of return on investment. The four variables evaluated were the method of utilizing the press cake remaining after the Pro-Xan containing juice is expressed, the method of disposition of alfalfa solubles remaining after the Pro-Xan is recovered from the juice, the length of operating season, and the size of the processing plant. The most profitable method of solubles disposition is dependent upon the feasibility of disposing of them in a nearby irrigation system, the price that can be obtained for them when concentrated for use as a feed ingredient, and the price of natural gas.

**PB-294 412/2** PC A04/MF A01  
Economic Research Service, Washington, DC.  
**Recycling Poultry Waste as Feed. Will It Pay**  
Agricultural economic rept.  
Mar 74, 59p Rept no. USDA/AER-254

Descriptors: \*Agricultural wastes, \*Poultry, \*Water pollution abatement, \*Agricultural economics, Circulation, Feasibility, Drying, Feeding stuffs, Lagoons(Ponds), Aerobic processes, Composts, Oxidation, Cost estimates, Processing, Fertilizers, Incinerators.

Identifiers: Developing country application, Recycling, Manure, Land application.

The recycling of dried layer waste (DLW) as feed to livestock and poultry is examined in considerable detail, but less information is available on recycling broiler waste. The cost of pollution abatement associated with alternative poultry-waste management systems is also analyzed. The cost of producing 1 ton of DLW is \$25, \$30, and \$46 for flock sizes of 80,000, 50,000 and 10,000 cage layers, respectively. Using available drying systems, on farm processing and feeding of DLW do not appear to be economically feasible for the family-size (10,000 layer) operation. However, processing and feeding DLW may be feasible for the larger operations. The highest net returns are attained by the larger operations when DLW is fed at 12.5 percent of the ration. Cost analyses of the alternative methods of waste abatement show land disposal and anaerobic lagoon treatment to be the least expensive. Mechanical drying, aerobic lagoon treatment, oxidation ditch treatment, and combined anaerobic-aerobic lagoon treatment fall within the intermediate cost range. Composting and incineration are the most expensive.

**PB-294 413/0** PC A06/MF A01  
Indian Inst. of Science, Bangalore. Dept. of Aeronautical Engineering.  
**A Low-Cost Water Pumping Windmill Using a Sail Type Savonius Rotor**  
S. P. Govinda Raju, and R. Narasimha. Jan 79, 110p Rept no. 79/FM/2  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Windmills, \*Pumps, Wind power generation, Rotors, Developing countries, Structural design, Rural areas.

Identifiers: Developing country application, \*Savonius rotors, Water pumps.

A water pumping windmill which can be built largely using materials and skills available in rural areas has been designed and fabricated. The windmill uses a Savonius rotor and incorporates a novel sail type construction. The pump is of positive displacement type using the casing of a pneumatic tire for the pumping chamber. Two prototypes have been constructed and these have indicated a reasonable performance and reliability.

**PB-294 414/8** PC A02/MF A01  
Nigerian Society of Agricultural Engineers, Zaria.  
**Impact of Industrial Development on the Quality of the Environment**

B. Z. Diamant. Aug 78, 18p  
Sponsored in part by Agency for International Development, Washington, DC. Conference Proceedings of the Nigerian Society of Agricultural Engineers (2nd), Zaria, August 28-31, 1978.

Descriptors: \*Developing countries, \*Environmental surveys, \*Industrial hygiene, \*Public health, Industrial plants, Water pollution, Air pollution, Urban planning, Housing, Disease vectors.

Identifiers: Developing country application, Solid wastes.

This document is a report presented to the second annual conference of the Nigerian Society of Agricultural Engineers, in Zaria, August 28-31, 1978. The purpose of this paper is to point out the mutual relationship that exists between industry and health, and the careful attention that has to be given to the health aspects while planning an industrialization program. The factors discussed in the paper are: water, air pollution, solid waste, town planning, vector control, housing, and industrial hygiene.

**PB-294 415/5** PC A06/MF A01  
Small Business Administration, Washington, DC.  
**Creer et Gerer une Petite Entreprise de Construction (Starting and Managing a Small Building Business)**

John R. Immer. 1962, 113p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Businesses, \*Management, Investments, Financial management, Sales, Publicity, Industrial relations, Financing, Land use, Inventory control, Commercial law, Construction.

Identifiers: \*Small businesses, \*Business administration, Developing country application.

Everything a new entrepreneur needs to know about starting a business is thoroughly covered in the handbook. Some of the topics covered include business structure, risks, capital management, mortgages, credit sources, business law, permits, building codes, insurance, employee relations, stock management, publicity and advertising, sales, business documentation for management, building plans and construction, preventing and meeting problems that cause delays, examples of several construction business failures and successes, amassing capital, future planning, land purchase and management, land subdivision and parcelling, and transportation. A special section is devoted to sources of further information.

**PB-294 416/3** PC A04/MF A01  
Appropriate Technology Development Association, Lucknow (India).

**A Search for an Appropriate Technology for Decentralised Cotton Spinning Industry in Rural India**

Survey and analytical studies series no. 1  
Robert Bruce. Nov 77, 53p

Descriptors: \*Textile processes, \*Spinning(Staple fibers), \*Cotton fibers, \*India, Technical assistance, Spinning frames, Machinery, Yarns, Rural areas, Developing countries, Planning.

Identifiers: \*Appropriate technology, Developing country application, Villages.

The paper describes the development of a small scale spinning unit in India. This development grew out of attempts to improve the Khadi hand spinning

technology when it was realized that it was at an economic standstill. A 432 spinning unit has been developed which can produce 20s count yarn of a quality acceptable to the cottage weavers, at a competitive price. This unit has great potential for further technical development to improve the quality and range of yarn that can be spun. The measures needed to carry this out are discussed at length.

**PB-294 417/1** PC A02/MF A01  
National Inst. of Foundry and Forge Technology, Ranchi (India).

**Fluoride Process - A Sodium Silicate Bonded Self-Hardening Sand System Using a Fluoride Hardener**

Interim rept.  
P. L. Jain, and P. K. Panda. 22 Mar 79, 10p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Foundry sands, Binders(Materials), Sodium silicates, Fluorides, Hardeners, Additives, Processing, Molds, Cores, Casting, Cost analysis, India.

Identifiers: Developing country application, Foreign technology.

Investigations have been carried out at NIFFT to develop a self-hardening sand system using sodium silicate binder and an inorganic fluoride hardener. The results obtained indicate a distinct possibility of using this process in preference to other inorganic or organic no-bake processes. The dimensional accuracy and casting finish obtained on the castings with this process are easily comparable to that obtained by other self hardening processes. The bench life, strength, and other sand characteristics are quite favorable and the breakdown properties are much better than in case of CO2 process. The process is also more economical than other organic and inorganic no-bake or self hardening processes, and can be quite suitable for the production of both moulds and cores for ferrous and non-ferrous castings.

**PB-294 419/7** PC A03/MF A01  
International Cooperation Administration, Washington, DC. Office of Industrial Resources.

**Les Fibres Vegetales et Leurs Utilisations (Vegetable Fibers and Their Uses)**  
1966, 37p

Descriptors: \*Plant fibers, \*Processing, Leaf fibers, Cotton plants, Bamboo, Reeds(Plants), Spinning(Staple fibers), Weaving, Ramie, Manila hemp, Sisal, Extraction, Textile industry, Spinning frames.

Identifiers: Developing country application, Villages.

The paper summarizes the processing and use of vegetable fibers with special emphasis on the development of this industry in the small-scale industrial sector in various countries. Covered are several subjects relative to vegetable fibers from the processing to manufacturing phases, including the equipment to be used at several stages, until the final product is obtained.

**PB-294 420/5** PC A03/MF A01  
International Cooperation Administration, Washington, DC. Office of Industrial Resources.

**Vegetable Fibers and Their Uses**  
Industry series.  
1966, 26p Rept no. COTTAGE INDUSTRIES BULL-5

Descriptors: \*Plant fibers, \*Processing, Developing countries, Leaf fibers, Cotton plants, Bamboo, Reeds(Plants), Spinning(Staple fibers), Weaving, Technical assistance, Far East, Asia, Tools, Machinery, Ramie, Manila hemp, Sisal, Extraction, Textile industry, Spinning frames.

Identifiers: Developing country application, Villages.

The paper summarizes the processing and use of vegetable fibers with special emphasis on the development of this industry in the small-scale industrial sector in various countries. Covered are several subjects relative to vegetable fibers from the processing to manufacturing phases, including the



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equipment to be used at several stages, until the final product is obtained.

**PB-294 421/3** **PC A03/MF A01**  
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.  
**Education by Alternation**  
Gerardo Angel Bacalini. 1979, 29p  
International Seminar on Appropriate Technology in Education held in Bogota, Colombia on January 29-February 2, 1979. Sponsored in part by United Nations Educational, Scientific and Cultural Organization, New York, and Agency for International Development, Washington, DC.

Descriptors: \*Education, \*Methodology, Meetings, Concepts, Learning, Social psychology, Objectives, Reasoning.  
Identifiers: \*Teaching methods, \*Training techniques, Developing country application.

Alternation is an educational system created in the rural areas of France which involves using alternating periods of physical activity with periods of study. The report discusses alternation and its origin.

**PB-294 422/1** **PC A02/MF A01**  
Ahmadu Bello Univ., Zaria (Nigeria). Dept. of Public Health Engineering.  
**Environmental Engineering Control of Bilharzia in the Middle East**  
c1977, 9p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Middle East, \*Schistosomiasis, Disease vectors, Control, Snails, Preventive medicine, Invertebrates, Trematoda, Worms, Infectious diseases, Parasitic diseases.  
Identifiers: Chronic diseases, Developing country application, \*Disease control.

Bilharzia is a chronic insidious disease which affects over 200 million people in 71 countries. This publication discusses the schistosomiasis disease, bilharzia, including the cycle of bilharzia; vector control methods; the snail habitat; and effective environmental snail control methods. A list of references is also provided.

**PB-294 423/9** **PC A19/MF A01**  
Monsanto Research Corp., Dayton, OH. Dayton Lab.  
**Development of Low-Cost Roofing from Indigenous Materials in Developing Nations**  
Final rept. 18 May 73-31 Dec 77  
George L. Ball, Ival O. Salyer, Dennis W. Werkmeister, R. A. Cass, and Arthur M. Usmani.  
20 Feb 78, 434p Rept no. MRC-DA-751  
Contract AID/CM/ta-C-73-12

Descriptors: \*Roofing, \*Developing countries, \*Composite materials, Fibers, Bagasse, Binders(Materials), Rubber fibers, Thermoplastic resins, Fabrication, Compression molding, Cost estimates, Philippines, Jamaica, Ghana.  
Identifiers: Developing country application.

This document covers a four-year research program to develop low-cost roofing from indigenous materials in three developing nations (Philippines, Jamaica, and Ghana). In Phase I, resources were surveyed, and collaborating individuals and organizations defined. In Phase II, experimental roofing composite materials systems were developed and optimized. In Phase III, demonstrations of the roofing manufacture were conducted and experimental roofs installed. Four composite panel roofing material systems were developed which use major percentages of indigenous bagasse filler, and minor amounts of phenolic or other resin binder. Three of the four processes use an intensive (Banbury) mixer. All four have compression molding as a final process step in panel fabrication. The products range in raw material cost from 6-14 cents per square foot of roofing panel, depending on composition, resin content, etc. The program was implemented in the three participating countries through advisory committees and technical working groups. Local labor, materials, and facilities were used to demonstrate manufacture of roofing by one or more of the processes.

**PB-294 424/7** **PC A04/MF A01**  
Agency for International Development, Washington, DC. Office of Science and Technology.  
**Expatriate Professionals as International Consultants**  
Joseph E. Stepanek, and Ming Ivory. Feb 79, 73p

Descriptors: \*Professional personnel, \*Consultants, \*Developing countries, Population migration, Manpower utilization, Consulting services, Expenses, Technical assistance, Resource allocation, Organizations, Administrative support, Scientific societies, Grants.  
Identifiers: \*Foreign nationals, \*Brain drain, Human resources, Developing country application.

The permanent migration of professionals to the more developed from the less developed regions of the world, in recent years referred to as the 'brain drain', is a problem of growing concern to all countries. The report reviews the major findings of selected studies undertaken during the last decade on the brain drain in order to assist the design of an action program. The report does not attempt an analysis of the brain drain problem but concentrates on one practical way of addressing it through a program which facilitates the return of expatriate professionals, residing in the United States, for relatively short periods as volunteer consultants to their countries of origin. The operational and financial implications of an expanding action program have been presented with suggestions for cost sharing.

**PB-294 425/4** **PC A03/MF A01**  
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.  
**Ceilandria Environmental Education Project**  
Gladis A. Bottaro Marques. 1979, 27p  
Sponsored in part by United Nations Educational, Scientific and Cultural Organization, New York, and Agency for International Development, Washington, DC. Proceedings of the International Seminar on Appropriate Technology in Education, Bogota, Colombia, January 29-February 2, 1979.

Descriptors: \*Schools, \*Instructional materials, Disadvantaged groups, Communities, Adults, Children, Learning, Citizen participation.  
Identifiers: Developing country application.

The report is based on the belief that by strengthening the role of education the school will be able to function as a center of resources for the whole community and it will aid the social and educational rehabilitation of neighborhoods. The objectives in the project were to get the community to really participate in the development of their town, make their habitat less aggressive, and achieve a true community relationship. Emphasized in the project were the two technologies considered appropriate for education: (1) open curriculum, and (2) the audio-visual teaching project for educational communication. An analysis of the experiences of the project is included in the document.

**PB-294 426/2** **PC A03/MF A01**  
Ministry of Education and Culture, Rio de Janeiro (Brazil).  
**Cartilla de Desayunos Escolares (School Lunch Program)**  
1963, 50p

Descriptors: \*Brazil, Schools, Children, Nutrition, Nutritional deficiency diseases, Food dispensing, Food preparation, Food services management, Developing countries, Technical assistance.  
Identifiers: \*School lunch program, Developing country application.

Basic information on how to start a school lunch program in a school to guarantee children at least one balanced meal a day is provided by this book, written for the Brazilian school system. The program's purpose is explained, and details are given for understanding basic nutrition; food preparation; financing the program; personnel, installations, and material needed; food preservation; preparing menus; distribution and control; and signs of undernourishment.

**PB-294 427/0** **PC A04/MF A01**  
Tennessee Valley Authority, Muscle Shoals, AL.  
**Caracteristicas de la Industria Mundial del Abono - Fertilizantes Fosfatados (Characteristics of the World Fertilizers Industry - Phosphatic Fertilizers)**  
Travis P. Hignett. Dec 67, 74p Rept no. AVT/S-422

Descriptors: \*Phosphorus, \*Fertilizers, \*Developing countries, Production, Inorganic phosphates, Phosphoric acid, Magnesium, Nitrogen, Tables(Data).  
Identifiers: Developing country application.

A revision of the estimated world fertilizer (phosphate) production capacity as related to the future needs in developing nations, and the evaluation of the availability of raw materials necessary to manufacture phosphate fertilizer. Extensive chemical equations, diagrams, tables and charts on acid phosphates (superphosphate), mineral phosphates, nitro phosphates, magnesium phosphates and related information are included along with an extensive bibliography.

**PB-294 430/4** **PC A02/MF A01**  
Ahmadu Bello Univ., Zaria (Nigeria).  
**Combined Vector Control Problems with Contradicting Host Habitats**  
B. Z. Diamant. cJan 76, 6p

Descriptors: \*Disease vectors, \*Pest control, Epidemiology, Etiology, Malaria, Schistosomiasis, Methodology.  
Identifiers: Reprints, Onchocerciasis, Developing country application, Hosts(Biology).

The paper deals with the specific problem of three vector-borne diseases--malaria, schistosomiasis, and onchocerciasis existing endemically in a tropical developing country. The suggested solution for an environmental control system, the Automatic Spillway Syphon, is described in this article. A reference list is included.

**PB-294 446/0** **PC A04/MF A01**  
Agency for International Development, Washington, DC.  
**Raising Rabbits in the Tropics**  
Charles H. Coleman. Jun 65, 62p

Descriptors: \*Animal husbandry, \*Rabbits, \*Developing countries, Manuals, Tropical regions, Selection, Buildings, Equipment, Breeding, Feeding stuffs, Animal diseases, Management.  
Identifiers: Developing country application.

This booklet is intended for the householder who wishes to procure a more nutritious diet for his family at a minimum of cost rather than for an individual who wishes to go into the commercial production of rabbit meat. Since most publications deal with raising rabbits in temperate, highly developed countries, the author has compiled this publication specifically for small-scale production in the tropics using the most economical methods possible.

**PB-294 447/8** **PC A03/MF A01**  
Agency for International Development, Washington, DC.  
**Une Methode Logique d'Elevage Avicole (The Poultry Result Demonstration)**  
David B. Mella, Haroldo Vasconcellos, and Frank E. Moore. 1978, 31p

Descriptors: \*Poultry, \*Developing countries, Poultry equipment, Buildings, Production, Manuals.  
Identifiers: Developing country application.

To raise poultry successfully, two conditions are essential; first, a certain degree of comfort must be given to the poultry of all ages and stages of productive life, and second, a practical form of management and system of raising the poultry must be followed. This book presents a demonstration of how to bring about these essential conditions as well as other factors which improve poultry farm productivity.

**PB-294 448/6** **PC A05/MF A01**  
American Water Works Association, New York.



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## Distribution des Eaux: Les Computeurs D'Eau (Water Meters)

1964, 91p  
 Descriptors: \*Water distribution, \*Water meters, Distribution systems, Installing, Tests, Maintenance, Efficiency.  
 Identifiers: Developing country application.

This is the second of four books on water distribution systems. It covers the choice, installation, testing, and maintenance of water meters. Proper use to maximize efficiency and the best methods of maintaining records is also mentioned.

**PB-294 449/4** PC A11/MF A01  
 American Water Works Association, New York.  
**Distribution des Eaux: La Gestion des Services (A Training Course in Water Utility Management)**  
 1964, 240p

Descriptors: \*Water distribution, \*Water services, \*Public utilities, \*Developing countries, Fire protection, Civil defense, Expenses, Accounting, Management, Public relations, Licenses.  
 Identifiers: Developing country application.

This is the third of a series of four books devoted to provision of a water distribution system in developing countries. This volume covers the following aspects of the system's management: Ownership and control of services; obligations of the service; fire protection; civil defense; water rights; authorizations and permits; regulation of the service; financing of private and public water services, scales of charges; accounting; administration; engineering and engineers; norms; care and maintenance of equipment and installations; insurance; personnel; structuring the work force; security; public relations; and annual reports. A check list for employees is included.

**PB-294 494/0** PC A03/MF A01  
 Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.  
**Appropriate Technology: Concept, Application and Strategies**  
 Bertha Salinas. 1979, 27p  
 Sponsored in part by United Nations Educational, Scientific and Cultural Organization, New York, and Agency for International Development, Washington, DC. Proceedings of the International Seminar on Appropriate Technology in Education, Bogota, Colombia, January 29-February 2, 1979.

Descriptors: \*Technical assistance, Education, Developing countries, Technology, Improvement, Planning, Community development, Rural areas, Research, Industries, Agriculture.  
 Identifiers: \*Appropriate technology, Developing country application, Villages.

The areas discussed in the paper are: (1) The characteristics of appropriate technology; (2) Appropriate technology and political projects; (3) Fields of application and methodology; and (4) International and regional strategies to support appropriate technology. A reference list is included.

**PB-294 528/5** PC A10/MF A01  
 India Planning Commission, New Delhi. Management and Administration Div.  
**Planning and Scheduling with Network Technique (PERT/CPM) (Programme Evaluation and Review Technique/Critical Path Method)**  
 Aug 66, 224p  
 Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Network analysis(Management), \*Critical path method, \*PERT, Management methods, Industrial management, Project management, Scheduling, India.  
 Identifiers: Developing country application.

Discussed in this manual is a specific application of the PERT and critical path networking techniques to Indian conditions.

**PB-294 546/7** PC A02/MF A01  
 Sussex Univ., Brighton (England). Inst. of Development Studies.

**Irrigation in Bangladesh**  
 Stephen D. Biggs, Chris Edwards, and Jon Griffiths. Feb 78, 24p  
 Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Irrigation, \*Developing countries, \*Bangladesh, Government policies, Rural areas, Manpower, Pumping, Water wells, Ground water, Irrigated land, Water supply, Planning, Employment, Pakistan.  
 Identifiers: Developing country application.

This paper summarizes a longer paper on irrigation in Bangladesh. It suggests that the development of irrigation is a precondition for a significant increase in agricultural output and employment. With scarcely any uncultivated land, higher food output can only come through widespread irrigation, which is applied to a mere 12% of cultivated land; and a more intensive use of land is essential if unemployment and under-employment in Bangladesh is not to further increase as one million additional workers each year look for jobs.

**PB-294 547/5** PC A03/MF A01  
 Sussex Univ., Brighton (England). Inst. of Development Studies.  
**An Introduction to the Health Planning and Budgeting Systems in India**  
 Discussion paper  
 Andrew Barnett. Dec 77, 34p Rept no. IDS/DP-121  
 Also pub. as ISSN-0308-5864. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*India, \*Budgeting, Foreign countries, Expenses, Data sources, Statistical data.  
 Identifiers: Developing country application, \*Health planning, Government.

Indian Government health expenditures have rarely been analyzed in published material- this omission is rapidly forming yet another constraint to change at a time when the whole Indian health care system is being questioned. This paper provides a guide to sources of material on health planning and budgeting in India and an initial analysis of government health expenditure on the basis of the data publicly available up to June 1976.

**PB-294 548/3** PC A03/MF A01  
 Sussex Univ., Brighton (England). Inst. of Development Studies.  
**Water to the Fields: Institutional Innovations in India's Command Area Development Programme**  
 Discussion paper  
 Robert Wade. Aug 75, 34p Rept no. IDS/DP-79  
 Also pub. as ISSN-0308-5864. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Irrigation, \*India, Organizations, Irrigation canals, Boundaries, Government policies, Water loss, Efficiency, Water distribution.  
 Identifiers: Developing country application, Institutional framework.

Irrigation development is now receiving high priority in India's agricultural development strategy. This paper describes what is being done to effect a number of major institutional changes in canal-irrigated areas, such as realignment of property boundaries, introduction of rotational irrigation, and formation of water users' associations. The paper argues that research on institutional aspects of water distribution, of which there has so far been remarkably little, is needed not only for understanding the distribution of income and power in rural society, but also for the formation of policies which might make that distribution less unequal.

**PB-294 549/1** PC A02/MF A01  
 Sussex Univ., Brighton (England). Inst. of Development Studies.  
**Towards Rural Futures: An Approach Through the Planning of Technologies**  
 Discussion paper  
 Robert Chambers. Jun 78, 24p Rept no. IDS/DP-134

Also pub. as ISSN-0308-5864. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Research, \*Technology, \*Developing countries, Economic development, Utilization, Rural sociology, Research management, Planning, Benefits, Expenses, Environments.  
 Identifiers: \*Research and development, Developing country application, Rural population.

The report discusses the potential of technological research and development for creating rural futures in third world countries, especially in South Asia and Africa. Against the background of forces which deepen and extend rural poverty, it suggests that new technology can either impoverish or, through imaginative R and D, may have a countervailing effect on the forces which tend to impoverish. It reviews some current approaches and then speculates on some gaps which they sometimes leave; R and D on R and D itself; learning from and working with rural people; environment-specificity; a future-orientation. It outlines criteria and a method of planning for identifying desirable new technology and lists types of environment for which the method might be useful.

**PB-294 555/8** PC A03/MF A01  
 Sussex Univ., Brighton (England). Inst. of Development Studies.  
**Nutrition and National Development Planning**  
 Discussion paper  
 J. L. Joy, and P. R. Payne. Oct 75, 40p Rept no. IDS/DP-83  
 Also pub. as ISSN-0308-5864. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Nutrition, Nutritional deficiency diseases, Food, Development, Planning, Requirements, Assessments.  
 Identifiers: Developing country application, \*Health planning.

Three papers are included in this document and constitute an attempt to define the position of food and nutrition issues in the context of development planning. They take as their starting point the proposition that the primary objective of development planning should be the reduction of deprivation. The areas discussed in the documents are: (1) the nature and range of the choices open to planners confronting the problem of nutrition deprivation and the kind of information needed for effective decision making; (2) the role of the nutritionist in relation to the planner and the politician; (3) the organization of the planning process.

**PB-294 568/1** PC A05/MF A01  
 Sussex Univ., Brighton (England). Inst. of Development Studies.  
**Health Needs and Health Services in Rural Ghana. Volume 1**  
 Jun 78, 95p

Descriptors: \*Developing countries, Assessments, Rural areas, Africa, Disadvantaged groups, Diagnosis, Preventive medicine, Evaluation, Public health, Participation, Recommendations.  
 Identifiers: \*Ghana, Developing country application, \*Health care requirements, \*Health care services, Health services research, \*Rural health services, Primary health care, Health resources.

This volume reports on research aimed to illuminate three main areas in the health sector: the development of health service appropriate to the needs of the disadvantaged groups in developing countries, particularly in the rural areas; community organization for health activities; and aid in the health sector. The research was approached through an interdisciplinary perspective.

**PB-294 569/9** PC A10/MF A01  
 Sussex Univ., Brighton (England). Inst. of Development Studies.  
**Health Needs and Health Services in Rural Ghana. Volume II: Appendices**  
 Aug 78, 212p

Descriptors: \*Developing countries, Rural areas, Africa, Disadvantaged groups, Preventive medi-



cine, Evaluation, Public health, Participation, Recommendations, Criteria, Effectiveness, Populations, Sanitation, Nutrition, Children, Allocations. Identifiers: \*Health care requirements, \*Ghana, Developing country application, \*Health care services, Primary health care, Health manpower education, Health resources, Health manpower.

This document contains eighteen appendices to complement Volume I. The topics covered in the appendices are: primary health care tasks; observation schedules; criteria of effectiveness; a typology of the villagers' options for health care; range of services provided; population coverage; polyclinic care; environmental sanitation; child nutrition; patterns of resource allocation; assessment of physical resources; assessment of manpower resources; health workers' training; community resources in health care; organizational assessment; and villages studied.

**PB-294 570/7** **PC A02/MF A01**  
Gandhian Inst. of Studies, Varanasi (India). Appropriate Technology Development Unit.

**Appropriate Technology for a New System of Education**

M. M. Hoda. 1979, 13p  
Presented at International Seminar on Appropriate Technology in Education, Held at Bogota, Columbia on January 29-February 2, 1979. Sponsored in part by United Nations Education, Scientific and Cultural Organization, New York, and Agency for International Development, Washington, DC.

Descriptors: \*Education, \*Technology assessment, Developing countries, Regional planning, Citizen participation, Economic development, Educational sociology, Rural sociology, Meetings, India. Identifiers: \*Educational technology, Teaching methods, Developing country application.

A plan and organization for a new system of education is proposed in this paper. It is an appropriate technology for education because it emphasizes acquiring skills and arts in the fields of village activities from the beginning. The purpose of this education would be to make its recipient a useful member of the community who should be able to enrich the environment to which he belongs.

**PB-294 571/5** **PC A02/MF A01**  
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.

**New School Project**

Vicky Colbert de Arboleda, and Oscar Mogollon. 1979, 20p  
Sponsored in part by United Nations Educational, Scientific and Cultural Organization, New York, and Agency for International Development, Washington, DC. Proceedings of the International Seminar on Appropriate Technology in Education, Bogota, Colombia, January 29-February 2, 1979.

Descriptors: \*Education, \*Developing countries, Project planning, Schools, Requirements, Rural areas, Students, Disadvantaged groups. Identifiers: Developing country applications.

Contained in this document are three parts. The first part describes a series of problems that characterize education in developing countries. The second part consists of a description of the New School Project with the principal components, methods, mechanisms, and expected results of the implementation. The third part analyzes how the New School Project constitutes as an alternative that responds to the educational needs more characterized in the underdeveloped nations, in accordance with the aspects in the first part.

**PB-294 572/3** **PC A04/MF A01**  
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.

**Appropriate Education and Its Correlative Technology**

Jairo Arboleda Toro. 1979, 67p  
Sponsored in part by United Nations Educational, Scientific and Cultural Organization, New York, and Agency for International Development, Washington, DC. Proceedings of the International Seminar on Appropriate Technology in Education, Bogota, Colombia, January 29-February 2, 1979.

Descriptors: \*Education, \*Technology assessment, Developing countries, Regional planning, Economic development, Educational sociology, Rural sociology, Meetings, Citizen participation. Identifiers: \*Educational technology, Developing country application, Teaching methods.

The general areas discussed include: (1) the validity of the concept of 'appropriate technology in education'; (2) its function in underdeveloped countries; (3) the areas that such a concept includes; and (4) the possibilities for international, regional or subregional action strategies originating from an appropriate technology in education.

**PB-294 573/1** **PC A03/MF A01**  
Harvard Univ., Cambridge, MA. Center for International Affairs.

**Economic Man and Engineering Man: Choice of Technology in a Low Wage Country**

Louis T. Wells, Jr. Nov 72, 41p Rept no. ECONOMIC DEVELOPMENT-226  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Technology assessment, \*Production methods, Developing countries, Production engineering, Decision making, Manufacturing, Production management, Fixed investment, Capital, Economic factors, Automation, Labor estimates, Manpower utilization. Identifiers: Engineering technology, Developing country application.

The study probes the complex factors that influence the manager in his choice of production techniques. The managers choice of technology appears to be influenced by two objective functions which are discussed; that of the 'economic man' to minimize cost, and the 'engineering man', which leads toward a more sophisticated, automated technology.

**PB-294 574/9** **PC A03/MF A01**  
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.

**An Experiment in the Use of the Low-Cost Teaching Materials-Packaging Useful to Schools Campaign**

Jose Francisco Nereu. 1979, 33p  
Sponsored in part by United Nations Educational, Scientific and Cultural Organization, New York, and Agency for International Development, Washington, DC. Proceedings of the International Seminar on Appropriate Technology in Education, Bogota, Colombia, January 29-February 2, 1979.

Descriptors: \*Instructional materials, \*Developing countries, Foreign countries, Instructors, Schools, Students, Publicity, Product development, Learning. Identifiers: Developing country application.

The main purpose of this paper is to show how the packages of the most popular consumer goods may be used as teaching materials. Described is the experiment conducted in Portugal between October 1974 and February 1977 and sponsored by the Ministry of Education and Scientific Research, General Office for Basic Education.

**PB-294 575/6** **PC A05/MF A01**  
Agency for International Development, Manila (Philippines).

**Time Series Analysis Handbook**

Kenneth F. Smith. Oct 75, 91p  
Descriptors: \*Time series analysis, Periodic variations, Seasonal variations, Trends, Variations, Planning, Philippines. Identifiers: Irregularities, Long term effects, Developing country application.

Four principles of time series analysis are described in this handbook. They include: long term trends; cyclical variation; seasonal variation; and erratic or unpredictable variation. The booklet is a how-to guide for managers in evaluating existing programs and for forecasting purposes.

**PB-294 576/4** **PC A03/MF A01**  
Vanderbilt Univ., Nashville, TN. Graduate School of Management.

**A Program for Achieving Better Project Management in Developing Countries**  
Morris Solomon. 18 Sep 74, 36p  
Contract AID/csd-3156

Descriptors: \*Project management, \*Developing countries, \*Management training, Organization theory, Industrial training, Personnel development, Supervision, Management methods, Instructional materials. Identifiers: Training, Skill development, Developing country application.

The paper outlines a world strategy for upgrading the project management capability of the developing countries, with particular attention to training. The strategy calls for: indigenous interdisciplinary training teams for each interested country; training with organizational focus; work on actual projects as a part of training; continuing participation of top management of organizations that are targeted; support of selected national training teams by regional centers of excellence; use of learning packages as a basis for training; a learning stance by trainers; and adaptation of learning packages to local needs and conditions.

**PB-294 599/6** **PC A08/MF A01**  
Swedish International Development Authority, Stockholm.

**International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Forest Industry Policy and Choice of Appropriate Technology**

Background paper  
R. H. Carlsson, D. G. Denoual, M. Hallberg, and E. Rheman. 28 Sep 78, 164p  
Report of Working Group No. 10, Appropriate Technology for the Manufacture of Pulp and Paper Products. Sponsored in part by Agency for International Development, Washington, DC., and United Nations Industrial Development Organization, Vienna (Austria).

Descriptors: \*Government policies, \*Industries, \*Forestry, \*Developing countries, Wood products, Conflicts, Paper industry, Wood pulp, Exports, Constraints, Management, Decision making, Market research, Production, Regulations, Salaries, Sweden, Canada. Identifiers: Developing country application.

The purpose of this primarily methodological paper is to study the problem of how the government in a less developed country can influence the choice of appropriate technology in its forest products industry. The early experiences of Sweden and Canada are studies which might have some similarities with the development situations in LDC's. A second step in this paper is the study of the overall global structure of some subsectors of the forest products industry.

**PB-294 600/2** **PC A03/MF A01**  
United Nations Industrial Development Organization, Vienna (Austria).

**International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for a Low-Cost Paper Project to Boost the Rural Economy**

Background paper  
T. Jeyasingam. Sep 78, 39p  
Report of Working Group No. 10, Appropriate Technology for the Manufacture of Pulp and Paper Products. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Manufacturing, \*Corrugating, \*Boxes(Containers), Developing countries, Economic development, Rural areas, Technology innovation, Production methods, Paper industry, Project management, Raw materials, Pollution, Pulp additives, Agricultural wastes, Paperboards. Identifiers: Research and development, Developing country application.

A project to manufacture liner board and corrugating medium to produce corrugated box containers has been identified as essential to boost the rural economy of developing countries. The appropriate technology for this industry is based on the use of agricultural residues for pulp production, the use of less steam, water and energy for processing,



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simple process techniques suitable for ease of operation and maintenance, flexibility of operational systems and reduction of pollution load. As this project is based on agricultural residues, it will have far reaching socio-economic benefits to the rural communities of developing countries.

**PB-294 601/0** PC A02/MF A01  
Food and Agricultural Organization of the United Nations, Rome (Italy). Advisory Committee on Pulp and Paper.

**International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Prospects for Establishing Viable Small-Scale Pulp and Paper Industries in Developing Countries**

Background paper.  
Sep 78, 15p  
Sponsored in part by United Nations Industrial Development Organization, Vienna (Austria), and Agency for International Development, Washington, DC. Report of Working Group No. 10, Appropriate Technology for the Manufacture of Pulp and Paper Products.

Descriptors: \*Paper industry, \*Pulp mills, \*Developing countries, Wood pulp, Production methods, Pulp, Equipment, Economic development, Environments, Papermaking, Pollution, Economic analysis, Energy.  
Identifiers: Developing country application.

Paper is such an important commodity in the development process that developing countries naturally want to establish their own paper industry to satisfy their own need and so reduce their dependency on outside supplies. The report discusses the basic problem areas encountered in creating a paper industry for developing countries.

**PB-294 606/9** PC A06/MF A01  
Michigan State Univ., East Lansing.  
**Studying Agricultural Institutions. A Modular Approach**  
Summary rept.  
Garland P. Wood. Jan 78, 113p  
Contract AID/csd-3132

Descriptors: \*Agricultural economics, \*Developing countries, Organizations, Management, Objectives, Education, Project planning, Economic development, Attitudes, Questionnaires, Costa Rica.  
Identifiers: Developing country application, Institutions.

This report details a model of how 'outsiders' can help public institutions become more effective in serving the economic development needs of the small farmer. Results of a partial test of this model in Costa Rica is also reported.

**PB-294 619/2** PC A03/MF A01  
Sussex Univ., Brighton (England). Inst. of Development Studies.  
**Health Aid: A Comparative Study of Three Donor Countries**  
Alastair White, Emmanuel De Kadt, and Neil Anderson. Jan 79, 35p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Developing countries, Comparison, Great Britain, Sweden, Netherlands, Foreign countries, Agencies.  
Identifiers: Developing country application, Voluntary organizations, \*Health programs.

The paper presents a summary of the finds of the IDS health research group's analysis of the aid given in the field of health by the governments and by the voluntary agencies of Britain, Sweden, and the Netherlands. The problems addressed here are the forms of health programs most urgently needed in developing countries and how programs should be ranked in terms of their usefulness.

**PB-294 621/8** PC A05/MF A01  
National Industrial Development Corp. Ltd., New Delhi (India).

**International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Evaluation of Appropriate Technology for Textile Production in a Developing Country**

Background paper.  
Sep 78, 80p  
Sponsored in part by United Nations Industrial Development Organization, Vienna (Austria), and Agency for International Development, Washington, DC. Report of Working Group No. 3, Appropriate Technology for the Production of Textiles.

Descriptors: \*Textile industry, \*India, \*Textile processes, Developing countries, Cotton fibers, Synthetic fibers, Spinning(Staple fibers), Fabrics, Textile finishing, Technical assistance, Clothing.  
Identifiers: \*Appropriate technology, Developing country application.

The textile industry is one of the earliest industries to occur in many developing countries. This paper attempts to analyze the relevance to developing countries of alternative technologies available for different stages of textile manufacture. The scope is restricted to the main apparel fibres cotton and manmade fibres. The discussion is primarily based on the profile of textile manufacture in India, where a wide range of technologies and scale of operations exist side by side.

**PB-294 622/6** PC A02/MF A01  
United Nations Industrial Development Organization, Vienna (Austria).  
**International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. The Role of National Institutions and Raw Materials Problems in Building Materials Industries**  
Background paper  
N. R. Hill. Oct 78, 24p  
Report of Working Group No. 5, Appropriate Technology for the Production of Cement and Building Materials. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Construction materials, \*Technology assessment, Developing countries, Raw materials, Industries, Production planning, Industrial training, Laboratories.  
Identifiers: Appropriate technology, Developing country application.

A common problem affecting the development of building materials and construction in developing countries is the lack of adequate expertise and laboratory facilities for the evaluation of suitable deposits of raw materials. This paper stresses the responsibility that rests with governments to ensure that trained staff and adequate central surveying and testing facilities are available.

**PB-294 624/2** PC A02/MF A01  
Sussex Univ., Brighton (England). Inst. of Development Studies.  
**Primary Health Care and the Role of Foreign Aid**  
Susan Cole King. Jan 79, 24p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Foreign aid, \*Developing countries, Implementation.  
Identifiers: Developing country application, \*Health care requirements, \*Health status, Primary health care, Health programs.

The paper discusses the basic health needs and the most important factors contributing to improvement in health status. The principles of basic health needs is summarized in Part I. Part II discusses the operational problems of implementing primary health care programs. Part III outlines the forms of aid required to address these operational problems and discusses the implications for donors' internal organizations and procedures, which at present constitute constraints to assisting programs which aim to meet basic health needs.

**PB-294 636/6** PC A03/MF A01  
International Inst. of Tropical Agriculture, Ibadan (Nigeria).

**Engineering for Appropriate Technology Farming Systems in the Lowland Humid Tropics**

Farming systems program  
Ray Wijewardene. 1977, 41p  
Report for 1977 of the Agricultural Engineering Sub-Program Crop Engineering Department. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Tropical regions, \*Agricultural machinery, \*Developing countries, Hand tools, Plows, Tractors, Planting, Harvesting, Pest control, Cultivation.  
Identifiers: Developing country application.

The subject of this document is alternate methodology which is low in energy and time and is appropriate to the environment. It is directed at the small and intermediate farmer in the humid tropics and discusses the development of tools which will enable them to adopt 'no till' or 'minimum tillage' techniques. The areas of research discussed include tools for weed control, tools for planting, tools for harvesting, and equipment for transportation. Tables for comparison of man-power requirements and productivity are included.

**PB-294 637/4** PC A02/MF A01  
Fondo Columbiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.  
**Non-Formal Education Ecuador's Experience. International Seminary on Appropriate Technology in Education, Held at Bogota, Colombia, on January 29-February 2, 1979**  
Patricio Barriga, and Enrique Tasiguano. 1979, 20p  
Sponsored in part by United Nations Educational, Scientific and Cultural Organization, Paris (France), and Agency for International Development, Washington, DC.

Descriptors: \*Education, \*Ecuador, Developing countries, Learning, Theaters, Radio communication, Informal organization, Visual aids.  
Identifiers: Developing country application.

The report discusses non-formal education as a sound effort in the search for alternatives for the population that lacks access to school education. The processes used in this experiment in non-formal education are described. They are: educational games, theater, illustrated novels, poster and radio. A bibliography is included.

**PB-294 638/2** PC A02/MF A01  
International Inst. of Tropical Agriculture, Ibadan (Nigeria).  
**Farming Systems Engineering - Summary of Projects for the 1975 'In-House-Review'**  
Farming systems program.  
Ray Wijewardene. Jan 76, 22p

Descriptors: \*Planting, \*Agricultural machinery, Sprayers, Hand tools, Design, Spraying, Tractors, Tropical regions.  
Identifiers: Developing country application.

This document is an illustrated report on the design and development of implements and tools to complement the new systems of farming being developed primarily for use by small farmers in the low-land, humid tropics and capable of indigenous manufacture. The topics covered are: weed control techniques, planting/fertilizer placement, harvesting, power tiller, land development and irrigation engineering.

**PB-294 640/8** PC A02/MF A01  
International Inst. of Tropical Agriculture, Ibadan (Nigeria).  
**Systems and Energy in Tropical Farming**  
Ray Wijewardene. 1978, 18p ASAE/TP-78/1511  
Sponsored in part by Agency for International Development, Washington, DC. Proceedings of the American Society of Agricultural Engineers, Palmer House Hotel, Chicago, Illinois, December 18-20, 1978.

Descriptors: \*Agriculture, \*Agricultural machinery, \*Nigeria, Tropical regions, Farms, Climate, Planting, Cultivation, Hand tools, Manpower, Fertilizers, Tractors, Constraints, Operations.  
Identifiers: Developing country application.



This report endeavors to analyze the constraints both environmental and physical to the productivity of the small farmer in the humid tropics. Discussed is the development and adaptation of tools to translate the most recent appropriate techniques applicable to the small farmer. Included are illustrations and a reference list.

**PB-294 643/2** **PC A02/MF A01**  
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.  
**Railroad Accident Report. Collision of Two Consolidated Railroad Corporation Commuter Trains, New Canaan, Connecticut**  
19 May 77, 25p Rept no. NTSB-RAR-77-4

Descriptors: \*Railroad trains, \*Accident investigation, Collisions, Railroad signals, Braking, Connecticut.  
Identifiers: \*Railroad accidents, ConRail system, Consolidated Railroads, New Canaan(Connecticut), Commuter rail systems, \*Railroad derailments, Human factors.

About 6:28 p.m., on July 13, 1976, Conrail commuter train No. 1994 collided with the rear of commuter train No. 1992 which was standing on the main track in New Canaan, Connecticut. The first car of No. 1994 and several cars of No. 1992 derailed. Two passengers were killed and 30 persons were injured. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the engineer of train No. 1994 to perceive the train ahead and to apply the brakes at the earliest possible time. Contributing to the accident was the excessive speed of the train as it passed the controlling signal at Cane and the inadequacy of the signal system to convey to the engineer the situation ahead and to insure compliance with the indications of the signals. During the investigation of this accident, the National Transportation Safety Board issued two recommendations concerning the signal system to the Connecticut Department of Transportation and two recommendations jointly to the Connecticut Department of Transportation and the Metropolitan Transportation Authority concerning the operation of exit doors. A recommendation on eliminating unsafe conditions in the cars' interiors was reiterated and a recommendation to the FRA to promulgate regulations on the operation and construction of commuter cars was issued.

**PB-294 644/0** **PC A05/MF A01**  
Agency for International Development, Washington, DC.  
**Survey of the State of Appropriate Technology in El Salvador**  
James S. Monachino. Nov 78, 98p

Descriptors: \*El Salvador, Developing countries, Technical assistance, Houses, Agriculture, Rural areas, Technology.  
Identifiers: \*Appropriate technology, Agency for International Development, Developing country application.

The purpose of the report was to survey the general state of appropriate technology which exists in El Salvador and to offer viable recommendations which could be utilized by the USAID/El Salvador Mission. The emphasis of this investigation was directed toward the rural residents and those institutions that interact with them.

**PB-294 645/7** **PC A03/MF A01**  
International Inst. of Tropical Agriculture, Ibadan (Nigeria).  
**Engineering for Appropriate Technology Farming Systems in the Lowland Humid Tropics**  
Farming systems program  
Ray Wijewardene. 1976, 28p  
Report for 1976 of the Agricultural Engineering Sub-Program Crop Engineering Department. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Agricultural machinery, \*Tropical regions, Planting, Harvesters, Plows, Tractors, Weed control, Production, Rice plants, Corn plants, Design.  
Identifiers: Developing country application, Small farms.

The development of energy reducing systems for crop production, and the appropriate tool technology to complement them, requires an appreciation for the range of crops being grown within each of these zones; cultural practices most appropriate to a sustained agriculture; water regime likely to be available; and the methods of weed control which might appropriately be applied. Illustrated and discussed in this report are the tools developed for increased crop production in the humid-tropics. They include: hand-held planters, propelled planters, a controlled droplet application agrochemical applicator, a hand maize sheller, a stripper harvester for rice and similar cereal crops, strip tillage, and mechanized cassava lifting. Tables are given for comparison of methods and productivity.

**PB-294 658/0** **PC A02/MF A01**  
Albany County Planning Board, NY.  
**Energy Report: Heat Transfer Principles**  
Technical memo (Final).  
May 78, 12p Rept no. TM/EC-1  
Contract HUD-D-11467, Grant HUD-CPA-NY-1164  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Heat transfer, Conduction, Convection, Thermal diffusion, Evaporation, Condensing, Books, Education.  
Identifiers: Developing country application, Greenhouse effect.

This pamphlet is a primer on the basics of heat transfer and related physical principles with a bibliography of primary sources.

**PB-294 659/8** **PC A03/MF A01**  
Albany County Planning Board, NY.  
**Energy Report: Climate, Wind and Heat Loss**  
Technical memo (Final).  
May 78, 26p Rept no. TM/EC-2  
Contract HUD-D-11467, Grant HUD-CPA-NY-1164  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Buildings, \*Heat loss, Climate, Wind(Meteorology), Preferred orientation, Positioning, Position(Location).  
Identifiers: \*Energy conservation, Developing country application.

This report focuses on climate and wind as they effect heat loss in structures, and recommends building orientation and wind control mechanisms which can be employed to mitigate these effects. A bibliography of primary sources is provided.

**PB-294 660/6** **PC A02/MF A01**  
Albany County Planning Board, NY.  
**Energy Report: Conductance, Resistance and Recommended Standards**  
Technical memo (Final).  
May 78, 19p Rept no. TM/EC-3  
Contract HUD-D-11467, Grant HUD-CPA-NY-1164  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Heat transmission, \*Buildings, Conductivity, Thermal resistance, Heat loss, Condensing, Temperature control, Houses, Standards.  
Identifiers: \*Energy conservation, Developing country application, Life-cycle cost, Mobile homes.

This energy conservation report deals with calculations of a structure's conductivity and resistance, and delineates a method for calculating the cost of fuel used over the life of mechanical equipment and construction materials. It also presents minimum energy conservation standards for one, two, and multi-family residential construction.

**PB-294 671/3** **PC A04/MF A01**  
Connecticut Univ., Storrs. Inst. of Public Service.  
**How to Conduct a Survey**  
Myron E. Weiner. 1964, 55p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Surveys, Instructional materials, Objectives, Methodology.

Provided in this book is a step-by-step approach in conducting a survey using the molecular concept. Case studies are given using the molecular concept.

**PB-294 674/7** **PC A07/MF A01**  
International Cooperation Administration, Washington, DC. Technical Aids Branch.  
**Selected References on Industrial Development**  
Mar 61, 139p

Descriptors: \*Industries, \*Economic development, \*Instructional materials, Documents, Information services, Market research, Capital, Finance, Construction, Government policies.  
Identifiers: \*Industrial development, \*Information sources, Developing country application, Small businesses, Handicrafts.

The manual provides selected references in industrial development. It provides reference materials and specifies guide lines which will be of direct use in meeting present program requirements of investment-industrial development staffs and organizations. Related materials are grouped for ready identification. A summary is provided of the useful facts contained in the documents, so that available material can be more readily evaluated.

**PB-294 677/0** **PC A03/MF A01**  
United Nations Industrial Development Organization, Vienna (Austria).  
**International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for Production of Sugar and Other Sweetening Agents**  
Background paper.  
27 Sep 78, 34p  
Report of Working Group No. 4, Appropriate Technology for the Production of Sugar. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Sugars, Production, Technical assistance, Food processing, Developing countries, Manufacturing, Methodology, Technology, Sugar crops, Tropical regions, Foreign countries, India.  
Identifiers: \*Appropriate technology, Developing country application.

Different technologies for the production of various sweetening agents such as gur, khandsari sugar, plantation white sugar, raw-sugar, refined sugar, etc. are described in detail in this paper. The quality of the products is specified. The cane, financial and technical skill requirements for various technologies are outlined. The parameters required for adoption of one technology or the other are indicated. It is pointed out that the vacuum pan technology for producing plantation white sugar is the cheapest and is ideally suited for developing countries.

**PB-294 683/8** **PC A04/MF A01**  
National Industrial Development Corp. Ltd., New Delhi (India).  
**International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Rural Industry**  
Background paper  
Sep 78, 58p  
Report of Working Group No. 8, Appropriate Technology for Light Engineering Industries and Rural Workshops. Sponsored in part by United Nations Industrial Development Organization, Vienna (Austria), and Agency for International Development, Washington, DC.

Descriptors: \*Industries, \*Rural areas, Economic development, Technology assessment, Industrial plants, Incentives, Organizations, Financing, Personnel development, Meetings, India.  
Identifiers: \*Industrial development, Rural economics, Developing country application, Small businesses.

The first section defines what rural industry is and establishes rationale for such industries. The second section deals with development of small and rural industries in India--the place of small and rural industries in industrial sector, facilities and in-



## APPROPRIATE TECHNOLOGY ABSTRACTS

centives for their development, present status, appropriate technologies, impediments to growth and India's experience. The third and the last section deals with the identification of major problems of appropriate technologies in the small and rural industries sector and the contributions which international organizations could make in overcoming such problems.

**PB-294 705/9** PC A02/MF A01

International Ozone Association.  
**Recent Development in the Role of Ozone in Water Purification and Its Implications in Developing Countries**

B. Z. Diamant. 1978, 25p  
Sponsored in part by Agency for International Development, Washington, DC. Proceedings of a Workshop on Marine and Freshwater Ozone Applications (2nd) Held by the International Ozone Association in Orlando, Florida, November 1-3, 1978.

Descriptors: \*Water treatment, \*Ozonation, \*Halo-gen organic compounds, Chlorine organic compounds, Disinfectants, Potable water, Oxidation, Economic analysis.  
Identifiers: Developing country application.

The recent discoveries of halo-organic carcinogens in water supplies have highlighted the long-existing, most suitable replacement to the hazardous chlorine--the gas ozone. This paper discusses the development of ozone in water purification as it relates to the developing countries. A reference list is included.

**PB-294 706/7** PC A06/MF A01

Indian Drugs and Pharmaceuticals Ltd., New Delhi.  
**International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology in Drug and Pharmaceutical Industries**

Background paper.  
Oct 78, 123p  
Sponsored in part by United Nations Industrial Development Organization, Vienna (Austria), and Agency for International Development, Washington, DC. Report of Working Group No. 2, Appropriate Technology for the Manufacture of Drugs and Pharmaceuticals.

Descriptors: \*Technology assessment, \*Drugs, \*Developing countries, Health, Medical services, Medical supplies, Marketing, Patents, Production methods, International trade, Government policies, Fixed investment, Capital, Pharmacology, Pharmacy.  
Identifiers: \*Industrial technology, Industrialization, Institutional role, Developing country application.

The report discusses the different aspects of the drugs and pharmaceuticals industry with particular reference to the drug needs in developing countries. There is no doubt that many developing countries have a long way to go in cultivating sophisticated technology in this field. However, the competence of various developing countries in adopting the production in the field of drugs and pharmaceuticals varies which is due not only to the different stages of educational development in general and of technological competence in particular, but also due to capital-intensive requirement of these industries. All the developing countries are in the process of reorganizing their health needs and today even the more developed among the developing countries are not prepared to provide medical needs to more than 20% of their population. It is fairly necessary that each of the developing countries defines its scope of production and phases out the work to be undertaken in this direction with ability to expand this for future development.

**PB-294 712/5** PC A05/MF A01

Agency for International Development, Manila (Philippines).  
**Statistical Survey and Analysis Handbook**  
Kenneth F. Smith. Mar 75, 78p

Descriptors: \*Surveys, Design, Methodology, Sampling, Statistical analysis, Instructional materials.  
Identifiers: Developing country application.

The book is a step-by-step illustrative guidebook emphasizing the principles and processes of scientific surveying. These include the fundamentals of survey design, statistical sampling procedures, analytical methodologies and presentation techniques. The steps described in detail include clarifying the purpose and defining the objectives; planning and organizing the survey; conducting the survey; evaluating the findings; and presenting the results.

**PB-294 718/2** PC A04/MF A01

Japan Industrial Technology Association, Tokyo (Japan).  
**Introduction to National Technology**

1977, 73p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Technology transfer, \*Technological intelligence, Abstracts, Descriptions, Publicity, Research, Patents, Consulting services, Licenses.  
Identifiers: \*Industrial technology, Developing country application, Research and development, Scientific research.

The first part gives a list and abstracts of over a hundred national technologies possessed by the Ministry of International Trade and Industry (MITI). The second part is a country paper presented at a symposium on technology transfer in New Delhi, India in February, 1978. The third part is an index of technologies offered and technologies sought.

**PB-294 722/4** PC A08/MF A01

Economic Research Service, Washington, DC.  
**Economics of Agriculture: Reports and Publications Issued or Sponsored by USDA's Economic Research Service, October 1966-June 1974**

Bonita Bell. 1974, 164p Rept no. ERS-368-SUPPL-1/6  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Agricultural economics, \*Bibliographies, Research projects, Commodities, Economic development, Foreign countries, Exports, Marketing, Farm management.  
Identifiers: Developing country application.

This report lists publications on agricultural economics and related socio-economic issues that were produced or sponsored by the Economic Research Service (ERS) between September 1966 and June 1974. Important among these are publications in Department and ERS series, periodic reports, articles in periodicals of the Department, and State experiment station bulletins which report results of State-Federal cooperative studies in agricultural economics. Publications are grouped by subject-matter areas and by ERS divisions responsible for research in such areas.

**PB-294 724/0** PC A05/MF A01

Department of Agriculture Extension Service, Washington, DC.  
**Les Clubs de la Jeunesse Rurale (Rural Youth Clubs Around the World)**

1967, 79p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Youths, \*Rural areas, Project planning, Project management, Group dynamics, Quality of life, Organizing, Farm crops, Developing countries.  
Identifiers: Developing country applications.

Rural youth work has been accepted as a way to introduce new ideas into rural life and train leaders and citizens for the future. Rural youth work is educational and aims at the total development of young people to prepare them for their role as useful citizens. A successful program is valuable to the youth who participate, the families involved, the community, and their country. Rural youth work is an effective way to close the gap between what is known about agriculture and home economics and what is actually practiced. This handbook shows how to establish, operate, and evaluate a rural youth program. Projects and special activities for youth groups are also discussed.

**PB-294 758/8** PC A04/MF A01

Technology Consultancy Centre, Kumasi (Ghana).  
**Annual Review Number 4, 1975-76**  
J. W. Powell. 1976, 66p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Technological intelligence, \*Consulting services, Ghana, Economic development, Industries, Government policies, Expositions, Technical assistance, Construction, Production methods.  
Identifiers: Industrial technology, Developing country application.

The objective of Centre is to promote industrial development in Ghana. The report discusses the 3rd Ghana International Trade Fair; the consulting services for government departments and large industries; consulting services for small industries; and the production units on the university campus such as small bolt and broadloom weaving.

**PB-294 759/6** PC A04/MF A01

Technology Consultancy Centre, Kumasi (Ghana).  
**Appropriate Technology in India. Report on a Study Leave, August-December, 1977**

J. W. Powell. 1977, 51p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Technology innovation, \*Rural areas, \*India, \*Nepal, Industries, Economic development, Engineering, Textile process, Cements, Manufacturing, Crafts, Solar energy, Sugars, Soaps, Vegetable oils, Papermaking, Woodworking, Methane, Ecology.  
Identifiers: \*Industrial technology, Rural population, Rural development, Developing country application.

The booklet is a study of small scale industries in India and Nepal and of the efforts being made to develop appropriate technologies for the establishment of decentralized industries in rural areas. It is an easy reference for specialists who may be interested in one or two technologies. Emphasis has been placed upon the advantages of each technology and the opportunities for its application with special reference to the problems of the rural poor. The topics covered are: textiles; engineering; cement making; craft industries; chemical processes; renewable energy; ecology; and non-mechanized transport.

**PB-294 760/4** PC A04/MF A01

Technology Consultancy Centre, Kumasi (Ghana).  
**Annual Review Number 3, 1974-75**  
J. W. Powell. 1975, 57p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Technology, \*Consulting services, \*Technical assistance, Economic development, Rural areas, Industries, Government, Finance, Ghana, Product development, Construction, Production management.  
Identifiers: Handicrafts, Developing country application.

The booklet is the annual review of the Technology Consultancy Centre of the University of Science and Technology in Ghana. The report discusses the Centre's role in the stimulation of grass-roots development by means of appropriate technology. The areas covered include: craft village projects; rural industries; consulting services for small industries; consulting services for ministries and government departments; and production units on the university campus.

**PB-294 761/2** PC A04/MF A01

Technology Consultancy Centre, Kumasi (Ghana).  
**Annual Review Number 5, 1976-77**  
J. W. Powell. 1977, 57p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Technology, \*Consulting services, \*Technical assistance, Economic development, Rural areas, Industries, Ghana, Product development, Industrial plants, Project management, Personnel selection, Financing.



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Identifiers: Handicrafts, Developing country application.

The review includes individual project reports on the soap pilot plant; the promotion of the rural industries of Ashanti; metal products design unit; and the handloom weaving unit. The appointment of a core staff of research fellows to the Technology Consultancy Centre and the involvement of social scientists in the work projects are new developments which are discussed.

**PB-294 762/0** **PC A03/MF A01**  
Technology Consultancy Centre, Kumasi (Ghana).  
**Case Study Number 1 - Lab. Products Ltd. A Case History of an Attempt to Use Institutional Support to Create Independent Commercial Manufacturing in Ghana**  
F. W. Lukey. Aug 78, 34p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Technology innovation, \*Manufacturing, \*Ghana, Universities, Technological intelligence, Commerce, Consulting services, Financial management, Metal products, Production engineering, Personnel selection, Profits, Exports, Imports, Supplies.  
Identifiers: Case studies, Developing country application.

The report includes the following topics: Origin of the industry; Financial policy; Performance in financial terms; Foreign exchange and import licenses; Customers; Personnel; Production efficiency; and Supplies.

**PB-294 842/0** **PC A12/MF A01**  
Sussex Univ., Brighton (England). Inst. of Development Studies.  
**The Prevention of Farm-Level Food Grain Storage Losses in India: A Social Cost-Benefit Analysis**  
R. A. Boxwell, M. Greeley, D. S. Tyagi, M. Lipton, and J. Neelakanta. 1977, 252p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Grains(Food), \*Food storage, \*India, Benefit cost analysis, Project planning, Improvement, Farms, Losses, Platforms, Bins, Aspergillus, Fungi, Metals, Damage, Rodents, Fumigation, Ethylene, Bromides, Chlorides.  
Identifiers: Developing country application.

The object of this document is to provide a social cost-benefit analysis of farm-level storage improvements in Andhra Pradesh. The major crop studied was paddy, and following a pilot project the main project team worked from 1974 to 1976 in six districts of Andhra Pradesh, with a base at the Indian Grain Storage Institute, Bapatla, Guntur District. The following areas are discussed in this report: The sample and measurement of losses; the present pattern of storage; the structure and pattern of storage; and social cost-benefit analysis of farm-level storage improvements programs. References, tables, and photographs are included.

**PB-294 896/6** **PC A11/MF A01**  
California Fertilizer Association, Sacramento. Soil Improvement Committee.  
**Manuel sur l'Emploi des Engrais (Western Fertilizer Handbook)**  
c1953, 231p  
Sponsored in part by Agency for International Development, Washington, DC. Library of Congress catalog card no. 75-14776.

Descriptors: \*Fertilizers, Manuals, Handbooks, Chemical properties, Soil fertility, Plant growth, Plant nutrition, Irrigation, Salinity, Soil tests, Storage.  
Identifiers: Developing country application.

Fertilizer is becoming increasingly important in modern agriculture, especially with the advent of high protein plants of the green revolution. This book divides the study of fertilizers into the following basic components: the soil; water; acid, salt, and alkaline soils; organic materials; chemical and organic fertilizers; how a plant functions; plant nutrition; tests to determine problems in the soil;

commercial fertilizers to correct soil conditions causing problems as determined by the above tests; transport and application of dry and liquid fertilizers; and proper use and storage of fertilizers and pesticides with special dangerous properties.

**PB-294 897/4** **PC A03/MF A01**  
Kansas State Univ., Manhattan.  
**L'Etude des Insectes (4-H Entomology Manual)**  
Dell E. Gates, and Wayne J. Colberg. 1978, 46p

Descriptors: \*Insects, \*Entomology, Manuals, Taxonomy, Reproduction(Biology), Arthropoda, Invertebrates, Identifying, Breeding.  
Identifiers: Developing country application.

Basic knowledge of entomology is necessary to protect beneficial species and to destroy harmful ones. This manual explains the place of insects in the animal kingdom, defines the phylum, and explains the biology of insects. Methods of collecting, mounting, and labelling insects are explained as well as protecting collected specimens and breeding. Additional chapters are devoted to the orders of insects, identifying them, and preparing demonstrations and documentation.

**PB-294 898/2** **PC A05/MF A01**  
Forest Service, Washington, DC.  
**L'Exploitation Forestiere (Logging Farm Wood Crops)**  
Fred C. Simmons. 1967, 94p

Descriptors: \*Forestry, \*Lumbering, Manuals, Hand tools, Saws, Cutting tools, Chisels, Tractors, Materials handling equipment, Storage, Roads, Maintenance, Transportation.  
Identifiers: Developing country application.

Logging operations can add to a small farmer's income. This manual explains how best to exploit one's forest resources. Covered are wheeled and tracked tractors and horses and mules for hauling; equipment (axes, saws, turning bills, strippers, levers, and protective covers); chain saws, circular saws, and other special tools, making and maintaining forest roads; storing and seasoning wood; marking and marketing; felling and cutting up trees; and loading and transport.

**PB-294 899/0** **PC A03/MF A01**  
Lutheran World Relief, Niamey (Niger).  
**Puisard Maraicher en Beton (Concrete Marsh Wells for Irrigation)**  
Gary Ellerts, and David Ingold. 1978, 46p

Descriptors: \*Water wells, \*Irrigation, \*Developing countries, Marshes, Concrete structures, Construction materials, Diagrams, Water table, Construction.  
Identifiers: Developing country application.

In marshy land it is difficult to dig a well or sunken draining trap of more than 40cm without the surrounding area caving in, resulting in loss of much cultivable land area. This system of construction is applicable only where the water table is less than 8 meters, a large number of wells are needed, financial means are limited, unsupervised labor is available, and cement is available at a reasonable price. Used properly it can greatly improve land use in regions like parts of the Sahel, where this system was developed.

**PB-294 900/6** **PC A04/MF A01**  
Forest Service, Washington, DC.  
**Les Termites Ravageurs du Batiment (Control of Nonsubterranean Termites and Subterranean Termites)**  
R. A. St. George, H. R. Johnston, R. J. Kowal, and Thomas E. Snyder. 1967, 66p

Descriptors: \*Termites, \*Pest control, Manuals, Pesticides, Life cycles, Construction, Sanitation, Foundations, Insecticides.  
Identifiers: Developing country application.

Termites leave telltale signs of their presence. This booklet describes those signs and outlines methods of preventing termite infestation through proper methods of construction allowing for raised platforms, ventilation, and chemical treatment of

wood. The life cycle and colony development of termites is explained, and structural, chemical and sanitary measures to save an infested building are discussed. A short section on other wood eating insects is included.

**PB-294 901/4** **PC A25/MF A01**  
Connecticut Univ., Storrs. Inst. of Public Service.  
**Preparing, Evaluating, and Managing Development Projects**

Lawrence J. Sespaniak, Morris J. Solomon, and John H. Bragg. May 73, 583p  
Prepared in cooperation with Massachusetts Univ., Amherst, and Ife Univ. (Nigeria). Inst. of Administration. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Project planning, \*Project management, \*Economic development, Developing countries, Professional personnel, Government policies, Manuals, Decision making, Investments, Capital, Cash flow, Economic analysis, Value, Benefit cost analysis, Agricultural economics, Social services, Yield, Prices, Group dynamics.  
Identifiers: \*Administrative principles, Case studies, Developing country application.

The purpose of the manual is to provide a methodology for developing projects at the ministerial level by both professional and administrative personnel. Major considerations involved in analyzing projects are described. They include: modules for analysis; datasheets and worksheets; schedules, cash flows, and difference flows; evaluating cash flows of a project; and human relations implications for project analysis. Several projects which are described are castor seed, agricultural, social, and a village health center. An international bibliography is included. Appendices outline compound interest and present value tables; sources of statistical data; steps in developing enterprise budgets and their interpretation; and project studies by participants.

**PB-294 903/0** **PC A03/MF A01**  
Agency for International Development, Washington, DC. Office of Institutional Development.  
**Kyfa Yofna Bayetoe Doojadgen Ahilee (Poultry Unit for Family and 4-S)**  
David B. Mellor, Haroldo Vasconcellos, and Frank E. Moore. 1960, 26p

Descriptors: \*Animal husbandry, \*Poultry, Manuals, Buildings, Tropical regions, Financing.  
Identifiers: Developing country application.

All the structures necessary for the raising of poultry in the tropics are described in this pamphlet. Notes on the care of the animals are also provided, and charts on the material needs and financial arrangements of several experimental farms are included.

**PB-294 904/8** **PC A03/MF A01**  
Agency for International Development, Washington, DC. Office of Institutional Development.  
**L'Amenagement d'un Poulailier Familial (Poultry Unit for Family and 4-S)**  
David B. Mellor, Haroldo Vasconcellos, and Frank E. Moore. 1960, 34p

Descriptors: \*Animal husbandry, \*Poultry, Manuals, Buildings, Tropical regions, Financing.  
Identifiers: Developing country application.

All the structures necessary for the raising of poultry in the tropics are described in this pamphlet. Notes on the care of the animals are also provided, and charts on the material needs and financial arrangements of several experimental farms are included.

**PB-294 955/0** **PC A06/MF A01**  
California State Div. of Mass Transportation, Sacramento.  
**Performance Measures for Public Transit Service**  
Final rept.  
Ernest Fuller, Jr. Dec 78, 115p DMT-033, UMTA-CA-09-8001-79-1



# APPROPRIATE TECHNOLOGY ABSTRACTS

Descriptors: \*Urban transportation, Evaluation, Services, Efficiency, Standards, Effectiveness, Transportation management.  
Identifiers: Public transportation.

The report identifies definitional, institutional, and technical difficulties associated with developing Transit Performance Measures (TPM's) for use in evaluating public transit service. A survey is made of contemporary evaluation processes and is evaluated in terms of their purpose. The procedures used by the Division of Mass Transportation of the California Department of Transportation in developing its list of TPM's is described, as well as suggested methods for developing performance standards. The necessity for linking TPM's to funding strategies is also discussed. The report recommends that further refinement and verification of the research methodology used in this research project is needed. It is pointed out that if public transit service evaluation can be developed effectively, it will greatly enhance the efficiency and effectiveness of public transit service.

**PB-294 984/0** PC A11/MF A01  
National Bureau of Standards, Washington, DC.  
Office of International Relations.  
**The Technological Knowledge Base for Industrializing Countries; Proceedings of the NBS/AID UNCSTD (United Nations Conference on Science and Technology for Development) Seminar Held at Gaithersburg, Maryland on October 16-17, 1978**  
Final rept.  
Raymond C. Sangster. Apr 79, 241p\* Rept no. NBS-SP-543  
Grant PASA-TA(CE)-6-71  
Sponsored in part by U.S. Coordinator for the UN Conference on Science and Technology for Development, and Agency for International Development, Washington, DC. Library of Congress catalog card no. 79-600058.

Descriptors: \*Technological intelligence, \*Industries, \*Meetings, Measurement, Developing countries, Quality control, Production management, Technology assessment, Health, Safety, Performance standards, Utilization, International law, Management analysis.  
Identifiers: \*Data base administration, \*Industrial technology, Commercial development, Developed nations.

The report contains the proceedings of a seminar held on the topic of establishing a technological knowledge base for industrializing countries. The areas of interest discussed are: Measurement capabilities and services required by technological industry; National and international standards required by industrializing nations; Acquisition of commercial industrial technology; and Industrial quality control.

**PB-294 990/7** PC A04/MF A01  
Woods Hole Oceanographic Institution, MA.  
Marine Policy and Ocean Management Program.  
**Abstracts of Readings in Fisheries Management and Common Property Resources**  
Technical rept.  
Yoshiaki Matsuda. Mar 79, 59 WHOI-79-36, NOAA-79032902  
Grant NOAA-04-8-M01-149

Descriptors: \*Fisheries, \*Bibliographies, Management, Abstracts, Regulations, Exploitation.  
Identifiers: Sea Grant program, \*Limited entry.

The literature reviewed and summarized in this document deals with a number of the major issues related to common property resource management, and with the particular management technique most often mentioned for fisheries - limited entry. As with any review of the literature, it is not inclusive; rather it attempts to cover the literature that is frequently referenced and/or basic to an understanding of common property resource management.

**PB-295 041/8** PC A03/MF A01  
National Engineering Lab. (NBS), Washington, DC.  
Center for Building Technology.  
**Protecting Adobe Walls from Ground Water**  
Final rept.

James R. Cliffron, and Frankie Davis. Mar 79, 29p  
Rept no. NBSIR-79-1730  
Sponsored in part by National Park Service, Washington, DC.

Descriptors: \*Walls, \*Clays, \*Fluid infiltration, Permeability, Ground water, Grout, Membranes, Drainage.  
Identifiers: \*Adobe bricks.

Two methods for creating impervious membranes in existing adobe walls were investigated. They were the injection of chemical grouts and installation of a metallic membrane. Chemical grouting was unsuccessful because of the low permeability of the tested adobe materials. The metallic membrane did prevent the migration of moisture in the adobe underneath the membrane, weakening the adobe. Further, soluble salts migrated to the surface of the wet adobe. Alternative methods for protecting adobe structures from ground water and runoff water are discussed, including the installation of effective drainage systems and upgrading the foundations.

**PB-295 065/7** PC A02/MF A01  
Sheaffer and Roland, Inc., Chicago, IL.  
**Energy Recovery from Manure Using Plug-Flow Digesters**  
John H. Martin, and Gene Dale. Dec 78, 9p  
ASAE/TP-78/4568

Descriptors: \*Agricultural wastes, \*Methane, Anaerobic processes, pH, Stability, Management planning, Feedlot wastes, Michigan, Wisconsin.  
Identifiers: \*Manures, \*Solid wastes, Synthetic fuels, Manufactured gas, Developing country application.

Two anaerobic digesters have been treating cow manure in Michigan and in Wisconsin for a few years. Both of them employ plug-flow, contrasted with stirred-pot, management of the manure and operate at mesophilic temperatures. They exhibit very high stability and good methane yield at feeding rates in excess of 10 Kg of volatile solids per day per cubic meter of digester volume (0.8 lb/cu ft/day). Dispersion occurs in the velocity of the material passing through the digester so that large pieces pass much more slowly than the hydraulic velocity. Odors in the effluent disappear when hydraulic detention times are as long as 4 days. From measurements of energy content, the biogas is about 60 percent methane. The pH of the digester is between 7.0 and 7.2 under most steady feeding conditions. Under transient feeding conditions it may range from 6.8 to 7.8.

**PB-295 087/1** PC A06/MF A01  
Civil Engineering Lab. (Navy), Port Hueneme, CA.  
**Calefaccion de Edificios y Agua Caliente para Uso Domestico Mediante Energia Solar (Solar Heating of Building and Domestic Hot Water)**  
Final rept. Jul 74-Dec 75  
E. J. Beck, Jr, and R. L. Field. Jan 76, 121p

Descriptors: Insolation, Heat storage, Architecture, Design, Cost analysis.  
Identifiers: \*Solar heating systems, \*Solar water heaters, Solar collectors.

This report provides guidance in the design and cost analysis of solar heating systems for buildings and domestic hot water (DHW). The nature of solar radiation, several types of solar systems, storage devices, and architectural considerations are among topics included. Calculation methods are included for determining collector size, storage size, simplified building and DHW loads, value of fuel saved, and saving-investment ratios. Eleven worksheets are used to enable the engineer with no prior experience with solar systems to accomplish a complete design and cost analysis. With this information he can prepare bidding and specification documents for the job. Tables of solar insolation at various Navy stations, typical building heat loads, collector prices by type, and storage tank prices are included. Two example problems are worked for tube-in-sheet collectors: one for space and DHW heating for a single dwelling; the other DHW supply for a dispensary.

**PB-295 179-T** PC A02/MF A01  
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.  
**Experiences of Community Participation in Non-Scholarized Initial Education in the Department of Puno - Peru**  
Walker Chalco. 1979, 20p  
International Seminar on Appropriate Technologies in Education, held at Bogota, Colombia, on January 29-February 2, 1979. Sponsored in part by United Nations Educational, Scientific and Cultural Organization, New York.

Descriptors: \*Education, \*Peru, Developing countries, Rural areas, Schools, Children, Attitudes, Roles(Behavior).  
Identifiers: Developing country application.

The paper describes a project undertaken to help the rural population in Puno, Peru to develop by supplying the maximum educational opportunities needed to satisfy the minimum essential needs to learn and for integral development of the largest number of peasant children under the age of six. The project is based on community participation as the community organizes itself to assume responsibility with the government for solving their different problems.

**PB-295 196/0** PC A02/MF A01  
Soil Conservation Service, Washington, DC.  
**Catfish Farming**  
Roy A. Grizzell, Jr, Olan W. Dillon, Jr, Edward G. Sullivan, and Lawrence V. Compton. Nov 75, 25p  
Rept nos. FARMERS/BULL-2260, FB-2260  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Catfishes, \*Aquaculture, Ponds, Containers, Water supply, Water quality, Eggs, Feeding stuffs, Proteins, Oxygen, Temperature, Turbidity, Animal diseases, Parasites, Harvesting, Cost analysis.  
Identifiers: Developing country application, Fish-kills, Predators.

Catfish farming is using water areas to produce crops of catfish by intensive management. This kind of farming requires constructing facilities; controlling water quality; spawning, hatching, and feeding fish; and harvesting and marketing the fish crop. A fish farmer can grow catfish in ponds, raceways, or cages. This bulletin discusses the production of channel catfish, blue catfish and white catfish. They are suited to warm-water culture where water temperatures are above 70 degrees F for at least 4 months each year. All are native to America and have a good conversion ratio of feed to meat.

**PB-295 216/6** PC A03/MF A01  
United Nations Industrial Development Organization, Vienna (Austria).  
**Animal-Drawn Agricultural Implements, Hand-Operated Machines and Simple Power Equipment in the Least Developed and Other Developing Countries; Report of a Manufacturing Development Clinic Held at New Delhi, India on 21-30 October 1974**  
1974, 46p  
Sponsored in part by Agency for International Development, Washington, DC., and Ministry of Agriculture, New Delhi (India).

Descriptors: \*Manufacturing, \*Agricultural machinery, \*Developing countries, Hand tools, Plows, Design, Proposals, Investments, Feasibility, Maintenance, Harvesters, Tractors, Disks(Agricultural), Technology transfer, India.  
Identifiers: Developing country application.

The Manufacturing Development Clinic on Animal-Drawn Agricultural Implements, Hand-Operated Machines and Simple Power Equipment in the Least Developed and Other Developing Countries was held at New Delhi from 21 to 30 October 1974. The Clinic was organized jointly by the United Nations Industrial Development Organization (UNIDO) and the Ministry of Agriculture, Government of India, as one of several projects to be undertaken jointly. The general objective of the Clinic was to explore ways and means to promote the local manufacture of appropriate agricultural ma-



chinery in the least developed and other developing countries of the world.

**PB-295 218/2** PC A02/MF A01  
Mindanao State Univ., Marawi City (Philippines).  
**Experiments in Rearing 'Siganus guttatus' (Pisces: Osteichthyes, Siganidae) in a Sea-Cage and Fishpen in the Philippines**  
Abduraj S. Tahil. Dec 78, 20p

Descriptors: \*Marine fishes, \*Aquaculture, \*Philippines, Feeding stuffs, Growth, Weight(Mass), Salinity, Temperature, Mortality.  
Identifiers: \*Foreign technology, Developing country application, *Siganus guttatus*.

Two different groups of juvenile *S. guttatus* fed entirely with benthic algae were reared in two different culture structures. After 24 weeks of rearing, one group with a mean standard length of 7.89 cm and average weight of 15.49 g, upon being stocked in a sea-cage, increased in length to 10.31 cm and 33.56 g in weight. The other group, reared in a fishpen for the same number of weeks, increased in length from a mean of 7.88 to 10.42 cm and in weight from 15.47 to 34.47 g. There was no significant difference in growth. Mortalities of 15.8 percent and 13 percent were obtained in the cage and fishpen, respectively. Growth comparison showed that *S. guttatus* is slower in growing than the other species of siganids. Some advantages of rearing signnids in the fishpen are described and further improvements are discussed.

**PB-295 235/6** PC A02/MF A01  
Executive Office of the President, Washington, DC.  
Assistant to the President for Intergovernmental Affairs.  
**Rural Development Initiatives: Overcoming the Problems of Isolation: Improving Rural Communications**  
Feb 79, 16p

Descriptors: \*Telecommunication, Rural areas, Regulations, Problem solving, Government policies.

The report documents a series of rural communication initiatives undertaken to improve rural life and overcome the problems or rural isolation through modern communications technology. These initiatives include FCC regulatory changes, Rural Electrification Administration (REA) telephone loans, and grants by several Federal agencies. They are intended to encourage the use of modern communications systems in bringing health, education, information, and entertainment to rural areas.

**PB-295 327/1** PC A06/MF A01  
Hawaii Univ., Honolulu. Sea Grant Coll. Program.  
**The Limu Eater. A Cookbook of Hawaiian Seaweed**  
Heather J. Fortner. Nov 78, 114p UNIH-SEAGRANT-MR-79-01, NOAA-79032801  
Grant NOAA-04-5-158-17

Descriptors: \*Algae, \*Aquatic plants, \*Food preparation, Rhodophyta, Hawaii.  
Identifiers: Sea Grant program, Recipes, \*Seaweeds, Limu.

A cookbook was created as a result of a study on Hawaiian seaweed, or limu. The Limu Eater introduces a food that is unfamiliar to most and identifies where it grows, what it looks like, how it is used, and where it can be found. In addition, it describes some of the ethnobotanical uses of local seaweed such as for medicine or in ceremony. Thus, what started out to be just a collection of recipes has become an introduction to the art and craftsmanship of limu eating. The recipes are from several sources. About a third of the 86 presented have already been published either locally or nationally.

**PB-295 499/8** PC A12/MF A01  
Denver Research Inst., CO. Office of International Programs.  
**The Past and Potential Role of the United States in the Transfer of Agri-Food Technology to Developing Countries**  
Final rept.

Theodore W. Schlie, Suellen Edwards, Floyd Shoemaker, Charles Slater, and Judson Harper.  
Mar 77, 273p NSF/PRA-7700892  
Grant NSF-PRA77-00892  
Sponsored in part by Department of State, Washington, DC. Prepared in cooperation with Colorado Univ., Boulder, and Colorado State Univ., Fort Collins.

Descriptors: \*Technology transfer, \*Developing countries, \*Food industry, \*Nutrition, United States, Agricultural products, Research, Technological intelligence, Technical assistance, Organizations, International relations, Agricultural economics.  
Identifiers: Industrial technology, Voluntary agencies, Research needs, Research and development, Private agencies, Agricultural production, Scientific research.

The report examines the processes of technology transfer with respect to food and nutrition in the United States and identifies the influencing factors of these processes. The results are useful in guiding technology transfer efforts from the United States to developing countries.

**PB-295 565-T** PC A14/MF A01  
Department of Agriculture, Washington, DC.  
**Prostrate Summer Cypress and Its Culture in Kirghizia**  
G. A. Balyan. 1979, 305p Rept no. TT-77-59026

Descriptors: \*Shrubs, \*Greases, \*Arid land, Morphology, Taxonomy, Plant growth, Cultivation, Nutritive value, Sheep, Utilization, Seeds, Viability, Translations, USSR.  
Identifiers: \*Foreign technology, *Kochia prostrata*.

Unlike cereals and legumes, cypress (*Kochia prostrata*) in arid regions does not dry up in summer and develops quite tender and highly-nutritious stems and leaves which are quite acceptable for sheep, horses and camels in all seasons of the year. The present book includes the methods of preservation of seed viability, biology, introduction, cultivation and utilization of cypress, as well as valuable recommendations regarding its culture in different conditions.

**PB-295 621/7** PC A07/MF A01  
Economics, Statistics, and Cooperatives Service, Washington, DC. Cooperative Management Div.  
**Understanding Our Cooperatives**  
Cooperative Information rept. (Final)  
C. H. Kirkman, Jr. Mar 79, 149p Rept no. CIR-6

Descriptors: \*Cooperation, \*Agricultural economics, \*Organizations, Government policies, History, Organization theory, Financing, Taxes, Capital, Management, Marketing.  
Identifiers: \*Cooperatives, Cooperative production and marketing system, Administrator responsibility, Employee responsibility.

The report, prepared for postsecondary schools, serves as a teaching aid to improve student understanding of cooperatives operating in the community. Written in textbook fashion, the report covers topics such as principles and practices of cooperatives, historical cooperative developments, economic democracy in action, and principles underlying cooperative financing and taxation. The publication has illustrations for making overhead transparencies.

**PB-295 643/1** PC A03/MF A01  
Institute for Building Science, Budapest (Hungary).  
**Appropriate Technology in the Construction and Building Materials Industry**  
G. Sebestyen. Nov 78, 29p Rept no. ISBN-963-7652-42-6

Also pub. as ISSN-0133-4328. Sponsored in part by United Nations Industrial Development Organization, Vienna (Austria), and Agency for International Development, Washington, DC. Paper from International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978.

Descriptors: \*Buildings, \*Construction industry, Developing countries, Construction materials, Technology assessment, Economic development,

Construction equipment, International relations, Technology transfer, Raw materials.  
Identifiers: Developing country application.

An important means to raise the effectiveness of a productive sector of the economy is the use of appropriate technologies. The objective of this paper is to highlight the problem of appropriate technologies in the construction and the building materials industry. The paper is divided into three chapters: The first chapter describes the main features of the construction and the building materials industry and summarizes the important role played by this sector in the national economy. The second chapter deals with the trends of economic and technical development in the construction and building materials industry and discusses the appropriate technologies for different processes. The third chapter is devoted to government policy and international actions promoting the use of appropriate technologies in the construction and building materials industry and the industrialization of construction.

**PB-295 644/9** PC A04/MF A01  
Agency for International Development, Washington, DC.  
**Agricultural Development Policy Paper**  
Jun 78, 70

Descriptors: \*Food, \*Agriculture economics, \*Developing countries, Policies, Project planning, Irrigation, Rural areas, Marketing, Credit, Nutrition, Income, Employment, Food storage, Production, Education.  
Identifiers: Developing country application, AID project.

This paper sets forth the major policy implications and issues for A.I.D. of a broadly participatory, employment-oriented agricultural production strategy for developing countries. The 'broadly participatory' strategy reflects the major U.S. development assistance objectives of helping developing countries: (1) Increase their capacity to expand and distribute food supplies to alleviate hunger and malnutrition, and (2) increase participation of poor people in the process and benefits of development. The strategy outlined in this paper suggests that improved diets in developing countries will in large measure depend on increasing food supplies mainly through accelerating agricultural production and improving food distribution, and expanding employment and income of low income families, thereby enabling them to purchase the food they need. It reviews the evolution of A.I.D. agriculture policy and stress the need for a restatement of policy based on a broadly participatory production strategy. It summarized the implications of the strategy and raises key issues in terms of five function priorities for assistance to agriculture.

**PB-295 645/6** PC A03/MF A01  
Columbia Univ., New York. Dept. of Chemical Engineering and Applied Chemistry.  
**Ethanol Fuels from Renewable Resources in the Solar Age**  
Harry P. Gregor, and Thomas W. Jeffries. 1979, 34p

Descriptors: \*Ethanol, \*Fuels, \*Organic compounds, \*Cellulose, \*Membranes, \*Agricultural wastes, \*Sugars, Technology, Cost analysis, Fermentation, Process charting, Hydrolysis, Filtration, Reverse osmosis, Evaporation.  
Identifiers: \*Chemical feedstock, Solid wastes, Manufactured gas, Synthetic fuels, Developing country application.

This communication describes how ethanol, other liquid fuels, and organic chemicals can be produced from cellulosic biomass at prices that can compete with those of petroleum derived materials by employing presently available or soon to be developed membrane technologies. Contemporary membrane technologies can already effect major savings in process costs for the conventional fermentation of grains or molasses to produce ethanol; developing membrane technologies could employ cheap cellulosic substrates for ethanol production.



## APPROPRIATE TECHNOLOGY ABSTRACTS

**PB-295 654/8**

**PC A03/MF A01**  
U-Form Systems and Technology, Inc., Livonia, MI.

**Design Properties, Structural Analysis and Construction Details for a Typical U-Form Wall System**

c1978, 28p

Sponsored in part by Agency for International Development, Washington, DC.

**Descriptors:** \*Buildings, \*Construction materials, Compression tests, Wind pressure, Floors, Walls, Building codes, Foundations, Earthquake resistant structures.

**Identifiers:** Developing country application, \*Shear walls, High rise buildings.

U-Form Systems and Technology, Inc. has developed an energy-efficient integrated building wall system called 'U-Form.' U-Forms serve as basic building for a low-cost, poured-in-place, reinforced concrete construction system combines structure, vapor barrier, superior thermal and sound insulation, fire retardance, and interior and exterior veneers. The system is applicable to sophisticated high-rise building and low-cost, low-rise buildings alike. Two 12 story apartment buildings of 116 units each were recently erected at the rate of two floors per week using only one six-man crew. U-Forms can be fabricated and erected with basically unskilled labor using a variety of local materials in low capital-investment situations. Hence, increasing applications are being found in urban renewal and in third world countries. (Copyright (c) 1978, U-Forms System & Technology, Inc.)

**PB-295 655/5**

**PC A03/MF A01**  
Indiana Univ. at Bloomington, International Development Research Center.

**Regional Agricultural Production Programs, Training and Design Strategies**

Burton E. Swanson. 1976, 31p

**Descriptors:** \*Agriculture, \*Production, \*Regional planning, Education, Agricultural economics, Project planning, Rice, Research, Farm management. **Identifiers:** \*Rural extension, \*Training, Teaching techniques, Developing country application.

The pamphlet presents a palpable portrait of certain real-world problems of institution building as an instrument of social and economic development, and of some practical responses to them. It presents case material about the training of research and extension workers in an international agricultural research center. It then examines key relationships between training and results--between the preparation of persons for developmental roles and eventual action in the field. The findings offer lessons for the design of certain kinds of agricultural production programs, and for using training as one tool in such design.

**PB-295 656/3**

**PC A03/MF A01**  
United Nations Industrial Development Organization, Vienna (Austria).

**Technologies from Developing Countries. Development and Transfer of Technology Series Number 7**

1978, 50p

Sponsored in part by Agency for International Development, Washington, DC.

**Descriptors:** \*Technology innovation, \*Developing countries, Technological intelligence, Plants(Botany), Animal products, Food industry, Wood products, Paper products, Pulp, Leather, Textile industry, Construction industry, Energy, Chemical industry, Plastics industry, Metal industry, Machinery.

**Identifiers:** Foreign technology, Developing country application.

Developing countries have frequently expressed the need for information on technologies evolved or adapted by other developing countries. Such information will be of benefit to them in the appropriate choice of technologies by providing alternatives and also a basis for promoting the exchange of information and sharing of experiences in this field. As part of its information activities UNIDO has been collecting information on technologies from developing countries through contacts with institutions related to research and development

and other sources of information in developing countries as well as through journals, reports and other publications dealing with such matters. This volume brings together in one place information on 138 technologies from developing countries. Generally, under each heading a brief description of the technology and its distinctive features are given.

**PB-295 734/8**

**PC A03/MF A01**  
Economics, Statistics, and Cooperatives Service, Washington, DC.

**Cooperative Development in Rural Areas**

Cooperative information rept.

Sep 78, 39p Rept no. CIR-1-SECT-4

**Descriptors:** \*Agricultural economics, \*Agricultural machinery, Marketing, Farms, Income, Financing, Rural areas, Sugar beets, Swine, Tobacco, Vegetables, Fruits, Processing, Fishes, American Indians, Capital.

**Identifiers:** \*Cooperatives.

Many conventional marketing and supply cooperatives have been formed by farmers in the past four decades. Cooperatives' membership consisted primarily of medium- and high-income farmers, although many also had a number of low-income farmers. Between 1957-75, 2,019 cooperatives were formed. New cooperatives formed by commercial farmers included sugar beet processing, tobacco marketing, peanut storage, and feeder pig marketing and farrowing. New cooperatives formed by low-resource farmers included marketing of fruits and vegetables, feeder pigs, and fish. In addition to providing historical and statistical background, this publication also provides information for organizing, financing, and managing cooperatives.

**PB-295 806/4**

**PC A03/MF A01**  
Stanford Univ., CA. Inst. for Communication Research.

**Radio's Role in Development: Five Strategies of Use**

Information bulletin

Emile G. McAnany. Sep 73, 34p AED/CDC/IB-4  
Sponsored in part by Agency for International Development, Washington, DC.

**Descriptors:** \*Radio communication, Radio broadcasting, Education, Rural areas, Utilization, Strategy.

**Identifiers:** Developing country application.

The radio at the present time is man's most universal mass medium of communication. The author outlines five utilization strategies that could prove most useful to developing countries: Open Broadcasting, Instructional Radio, Radio Rural Forums, Radio Schools, and Radio and Animation.

**PB-295 813/0**

**PC A02/MF A01**  
Los Alamos Scientific Lab., NM.

**Passive Solar Systems Development**

J. Douglas Balcomb. Sep 76, 15p

Sponsored in part by Energy Research and Development Administration, Washington, DC.

**Descriptors:** Design, Reviewing.

**Identifiers:** \*Passive solar heating systems, Solar heating systems, Developing country application.

Definition of a passive solar heating and cooling system as one in which the thermal energy flows by natural means. This includes systems in which insulation for example, is moved by manual or electric means, once or twice a day. A sort of generic description of the various approaches to passive solar heating and cooling are illustrated with a few examples.

**PB-295 814/8**

**PC A02/MF A01**  
Columbia Univ., New York. Dept. of Chemical Engineering and Applied Chemistry.

**For Today: Membrane-Produced Gasohol. For Tomorrow: Membrane-Produced Alcohol**

1979, 12p

Sponsored in part by Office of Minority Business Enterprise, Washington, DC., and Agency for International Development, Washington, DC.

**Descriptors:** \*Sugars, \*Fuels, \*Ethanol, Graphs(Charts), Fermentation, Cellulose, Alcohols, Grains(Cereals), Hydrolysis, Cost analysis, Electrodialysis, Membranes, Fluid filters, Osmosis, Biomass, Process charting, Design criteria, Cost analysis.

**Identifiers:** Developing country application, Gasohol, Reverse osmosis, Manufactured gas, Synthetic fuels, Ultrafiltration.

This pamphlet, shows in charts the following: (1) Conventional process for production of fuel-grade ethanol from sugars; (2) Alcohol from grain or molasses with membrane treatment of stillages; (3) Treatment costs for stillages; (4) Membrane-controlled fermentation of sugars to ethanol; (5) Membrane facilitated hydrolysis of cellulose.

**PB-295 919/5**

**PC A10/MF A01**  
ACTION/Peace Corp., Washington, DC. Information Collection and Exchange.

**Resources for TESOL Teaching: A Handbook for Teaching English to Speakers of Other Languages**

Program and training journal reprint series

Eleanor C. Boone, Rick Gildea, and Pat Moran.

Sep 78, 212p Rept no. REPRINT-26

**Descriptors:** \*Instructional materials, \*English language, Manuals, Reading, Writing, Education, Terminology, Visual aids, Training devices, Speech.

**Identifiers:** \*Teaching guides, Developing country application, Educational resources, Pronunciation, Grammar.

The manual is divided into two parts. The first part consists of seven chapters, the first six of which deal specifically with resources (teaching ideas, techniques and suggestions) on how to present, develop and reinforce pronunciation, grammar, vocabulary, reading, writing and conversation. There is an additional chapter on games as techniques for reviewing the language skills already taught. The second part of the manual, the appendices, contains information pertaining to the language itself.

**PB-295 953/4**

**PC A09/MF A01**  
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.

**Community Health Education in Developing Countries**

Program and training journal manual series.

c1978, 195p Rept no. MANUAL-SER-8

Prepared by American Public Health Association, Washington, DC. Contract PC-77-043-1020. Sponsored in part by Agency for International Development, Washington, DC. Errata sheet inserted.

**Descriptors:** \*Public health, \*Education, \*Developing countries, Community development, Project planning, Instructional materials.

**Identifiers:** \*Health education.

The pamphlet was developed for those persons, from whatever backgrounds, who are interested in promoting change to improve the health conditions of their communities. One may be a teacher, a community agriculture extension worker, a social worker or a well driller. The manual is a guide -- a working and teaching tool -- to help one get started on a community health project through health education. Health education is a process through which behavior changes are effected. Health problems are rooted in specific behaviors: changing those behaviors will change a community's health status.

**PB-295 955/9**

**PC A08/MF A01**  
TRANET, Rangeley, ME.

**The Relevance of AT (Appropriate Technology) Development in the U.S. to the Third World (A Compendium of U.S. A.T. Organizations)**

Frederick W. Smith. 1979, 163p

Sponsored in part by Agency for International Development, Washington, DC., Organization for Economic Co-Operation and Development, Paris (France), and International Bank for Reconstruction and Development, Washington, DC.

**Descriptors:** \*Organizations, \*Technology innovation, \*Developing countries, Directories, United



States, Economic development, Technological intelligence, Low income groups, Problem solving, Research management, Technical assistance, Information centers, Technical societies, Consultants, Consulting services.  
Identifiers: Research and development.

Development agencies such as the World Bank, O.E.C.D., A.I.D., and others are beginning to recognize the need for experts familiar with small scale, low-cost and easily maintained technologies and also techniques which involve low-income people in solving their own problems. The report explores crucial and important resources of AT developments within the United States, and is concerned with its impact on the lives of low-income people and its possible relevance to Third World development. The authors have tried to reach a broad representative range of AT practitioners, the persons actually designing and using alternate/appropriate techniques, rather than to select the most technically qualified.

**PB-296 041/7** **PC A18/MF A01**  
ACTION/Peace Corps, Washington, DC.  
**A Handbook for Cooperatives Fieldworkers in Developing Nations; Sections One through Seven**  
Information collection and exchange resource packet no. 5  
Mark S. Ogden. 1978, 410p

Descriptors: \*Developing countries, \*Organizing, Instructional materials, Farms, Handbooks, Financing.  
Identifiers: Developing country application, Volunteer programs, Cooperatives.

Seven sections written by experienced volunteers include: an introductory section; cooperatives--general concepts; cooperative organization; cooperative management; cooperative education and training; specific program-related information; and resources.

**PB-296 052/4** **PC A06/MF A01**  
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.  
**Teaching Reading and Creative Writing: A Language Experience Approach**  
Program and training journal Reprint series  
Margaret Hart. Sep 78, 106p Rept no. REPRINT SER-20

Descriptors: \*Instructional materials, \*Reading, \*Writing, Developing countries, English language, Phonology, Linguistics, Handwriting, Books, Vocabulary.

The course of study was developed for five remedial reading classes of secondary school students. The basic method used here can be adapted for teaching reading and creative writing to students from the infant school level to adulthood. The vocabulary, or thought content of the material, will be relevant to the student because it comes from his own background of experience. The course of study consists of recording stories dictated by individuals, and using these stories as a basis for developing the required skills for reading, and creative writing.

**PB-296 072-T** **PC A06/MF A01**  
National Marine Fisheries Series, Washington, DC.  
**Problems in Prawn Culture**  
Aquaculture series 19  
Kunihiko Shigeno. c1978, 104p Rept no. TT-74-52032

Descriptors: \*Shellfish, \*Aquaculture, Ponds, Larvae, Sea water, Books, Salt water, Reproduction(Biology), Growth, Packing, Cost analysis, Feeding stuffs, Production, Temperature, Mortality, Japan, Translations.  
Identifiers: \*Penaeus japonicus, Prawns, \*Foreign technology.

Japan is the leading producer of cultured prawns. The present book reviews the work done in Japan on prawn culture in abandoned salters. The data obtained from Himejima farms, where prawns are grown in outdoor concrete tanks in unfiltered sea water, are the main source of the material for this

book. The author discusses the salient features of seed production with great emphasis on the selection of gravid prawns, methods of hatching and growth of seedlings. Culture methods have been elaborated and valuable suggestions offered on all aspects of prawn culture.

**PB-296 085/4** **PC A05/MF A01**  
Pacific Environmental Services, Inc., Santa Monica, CA.  
**Evaluation of Vapor Leaks and Development of Monitoring Procedures for Gasoline Tank Trucks and Vapor Piping**  
Robert L. Norton. Apr 79, 98p EPA/450/3-79/018  
Contract EPA-68-02-2606

Descriptors: \*Air pollution control, \*Organic compounds, \*Tank trucks, \*Regulations, \*Monitoring, Cost analysis, Leaks, Vapors, Gasoline, Cargo transportation, Tests, Maintenance, Equipment, Piping systems.  
Identifiers: \*Fugitive emissions, Service stations, Procedures.

This technical document provides information on control techniques, monitoring procedures and costs for maintaining gasoline tank trucks and vapor piping in 'vapor tight' conditions. The leak sources and evaluation of different low cost and quick monitoring and test procedures are also discussed. This document provides the support information for the Office of Air Quality Planning and Standards guideline series document entitled 'Control of Volatile Organic Compound Leaks from Gasoline tank trucks and Vapor Collection Systems,' PB-290 568, December 1978.

**PB-296 096/1** **PC A03/MF A01**  
Institute of Medicine, Washington, DC.  
**Review of the Agency for International Development (AID) Health Strategy: A Committee Report**  
Final rept.  
Sep 78, 38p Rept no. IOM-78-05  
Contract AID/ta-C-1478

Descriptors: \*Developing countries, Guidelines, Strategies, Nutrition, Sanitation, Tropical diseases, Research, Populations.  
Identifiers: \*Health care, \*Agency for International Development, Developing country application, Health planning, Health care delivery systems, \*Environmental health, Family planning.

The report includes review and comment on two internal documents developed by AID to state its policy and program guidelines in health, population, and nutrition. The reviewing committee doubted the value of elaborate planning exercises in host countries, recommended a slow approach to integrated health services projects and warned against losing categorical programs, advised that family planning programs be more finely adjusted to the types of people for whom they are intended, urged that P.L. 480 programs be better coordinated with AID nutrition programs and that AID help establish and train for research capabilities in countries where nutrition research is needed, recommended that AID emphasize water and sanitation systems whose maintenance is appropriate to the technology of the country, and urged a high priority for tropical diseases research.

**PB-296 362/7** **PC A04/MF A01**  
Georgia Inst. of Tech., Atlanta. Economic Development Lab.  
**Directory of Consultants to Small Rural Industries. Employment Generation Through Stimulation of Small Industries**  
Kay E. Auciello, and Richard Johnston. Oct 75, 52p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Consultants, \*Consulting services, \*Directories, Agriculture, Developing countries, Economic development, Industries, Rural areas, Technical assistance, Management, Organizations, Job analysis, Employment, Project management, Systems analysis.  
Identifiers: Job development, Developing country application.

The directory is the first attempt to compile a listing of experienced individuals and organizations currently interested and experienced in assisting, on a contract basis, the development of small rural industries in developing countries. For this purpose, small rural industries are defined as agro-industrial establishments of 20 or fewer employees and assistance as a system approach to aspects of technical and managerial assistance. The first section of directory lists organizations and the second section lists individuals. Each entry is arranged alphabetically by the country in which its headquarters are located.

**PB-296 363/5** **PC A02/MF A01**  
Bio-Gas of Colorado, Inc., Arvada.  
**Conversion of Feedlot Wastes into Pipeline Gas**  
Frederick T. Varani, and John J. Burford, Jr. 1979, 24p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Agricultural wastes, \*Anaerobic processes, \*Methane, Pilot plants, Process charting, Design criteria, Performance evaluation, Capitalized costs, Cost analysis, Operating costs, Technology, Residues, Pyrolysis.  
Identifiers: \*Manure, Manufactured gas, Solid wastes, Developing country application, Synthetic fuels, Bioconversion.

Agriculture waste material such as steer manure has an energy value which ranges from 3000-8000 BTU per pound of solid material. This material is currently being used, almost exclusively, in its traditional manner as an addition to agricultural croplands. This study concludes that there is a commercially viable energy potential from agricultural waste conversion using an anaerobic digestion system.

**PB-296 373/4** **PC A04/MF A01**  
Brookings Institution, Washington, DC.  
**An Assessment of Development Assistance Strategies**  
Interim rept.  
Lester E. Gordon. 6 Oct 77, 62p  
Contract AID-1722-720235

Descriptors: \*Economic development, \*Economic assistance, \*Developing countries, Technical assistance, Project planning, Allocations, Financing, Organizations, National government, Plant genetics, Nitrogen fixation, Food, Rural areas, Irrigation, Imports, Recommendations.  
Identifiers: Developing country application.

This interim report is an assessment of foreign development assistance strategies initiated by the Secretary of State in late June 1977. The study focuses its inquiry on the following key questions: (1) What are the central development problems facing the poor countries, and what bearing do they have on our interests. (2) What lessons from more than two and a half decades of experience should be incorporated into any future development assistance strategy. (3) What should be the purposes and content of any future U.S. development assistance strategy. What are the implications of this strategy for the size and organization of U.S. bilateral and multilateral development assistance. (4) How should that assistance relate to the other U.S. economic programs that affect the progress of the poor countries.

**PB-296 382/5** **PC A14/MF A01**  
Colorado State Univ., Fort Collins.  
**Water Lifters and Pumps for the Developing World**  
Master's thesis  
Alan D. Wood. 1976, 316p  
Contract AID/csd-2460

Descriptors: \*Pumps, Developing countries, Water supply, Irrigation, History, Valves, Reviews, Technology assessment, Theses.  
Identifiers: \*Water lifters, Developing country application, State of the art.

This thesis presents a state-of-the-art on water lifters and pumps which are, or can be, used throughout the world, and particularly in develop-



ing areas. A brief review is given of the historical development of these devices. Through an extensive literature review and survey of manufacturers and research organizations, this thesis inventories the wide range of water lifting methods which are randomly discussed by these sources and sets forth; (a) a unifying classification format, (b) the basic operation and typical applications of each class, and (c) a review of applicable prime movers. In addition, criteria used in the selection of water lifters and prime movers is presented with emphasis on water requirements, availability and cost analyses. In this manner, the present status of water lifting in both developing and developed countries is reviewed and several recent projects by international organizations, e.g., AID, are identified which seek to improve existing methods, develop new ones, and disseminate educational material. Through this state-of-the-art, similar and additional areas of water lifting which need technological or sociological attention are then explicitly or implicitly identified.

**PB-296 385/8** **PC A03/MF A01**  
Wisconsin Univ.-Madison. Coll. of Engineering.  
**Cryogenic Recycling of Solid Waste**  
Norman R. Braton. 1978, 26p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Materials recovery, \*Solid waste disposal, Cryogenics, Brittle fracturing, Separation, Elastomers, Metal scrap, Polymers, Mobile equipment, Waste utilization.  
Identifiers: Developing country application, Tire recycling, Waste processing, Metal recycling, Waste processing plants.

Liquid nitrogen cryogenic processing of various materials is introduced. Fracture toughness of materials is discussed in relation to cryogenic processing, and some specific applications of cryogenic recycling are mentioned. A short description of a mobile prototype unit for cryogenic processing of a variety of materials including tires and cables is given.

**PB-296 404/7** **PC A06/MF A01**  
Volunteers for International Technical Assistance, Inc., Schenectady, NY.  
**Evaluation of Solar Cookers. Part I**  
1962, 108p Rept no. VITA-10  
Prepared in cooperation with Office of Technical Services, Washington, DC. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Cooking devices, \*Solar heating, Evaluation.  
Identifiers: Developing country application, \*Solar cookers.

The report presents results of tests performed on various solar cookers to determine their potential usefulness in countries served by the International Cooperation Administration. Points evaluated were cooking performance and efficiency, durability, cost, shipping weight, portability, ease of operation, ease of manufacture in the countries involved, and adaptability to local techniques and dietary mores. Of all models available for test, a Fresnel-type cooker developed by VITA showed the greatest promise, due particularly to its efficiency, low cost and ease of construction with universally available tools and materials.

**PB-296 425/2** **PC A11/MF A01**  
ACTION/Peace Corps, Washington, DC.  
**Wells Manual. Special Issue**  
Program and training journal  
Francis A. Luzzatto. Jan 75, 243p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Water wells, \*Manuals, Technology, Construction, Well pumps, Specialized training, Developing countries, Foreign aid, Potable water, Ground water, Africa.

The manual is to provide information on a wide range of well construction techniques. Hopefully, the user will not see each method of construction separately, but rather be able to synthesize tech-

niques to fit the particular situation. The manual offers a number of technical and methodological combinations, making it possible to select the most efficient well method.

**PB-296 444/3** **PC A03/MF A01**  
Bio-Gas of Colorado, Inc., Arvada.  
**Energy Potential Through Bio-Conversion of Agricultural Wastes**  
Oct 76, 32p  
Contract FCRC-651366075  
Prepared in cooperation with Colorado Energy Research Inst., Golden. Sponsored in part by Agency for International Development.

Descriptors: \*Agricultural wastes, \*Fuels, \*Fertilizers, \*Feeding stuffs, Organic compounds, Methane, Residues, Algae, Technology, Farm crops, Food processing, Sites, Feasibility, Forecasting, Capitalized costs, Electric power plants, Process charting, Design criteria, Economic analysis.  
Identifiers: \*Bioconversion, Synthetic fuels, Manure, Developing country application, Manufactured gas, Solid wastes.

To determine the feasibility of using the bio-conversion process, the Bio-Gas study team examined factors ranging from an inventory of readily collectable agricultural wastes in the area to an evaluation of the potential markets for the products of bio-conversion. The results of this study point favorably toward large-scale bio-conversion plants and to potential applications of bio-conversion on a small scale for dairies and feedlots. The study's economic analysis concludes that the methane produced from such a bio-conversion facility would be cheaper than all other domestic synthetic natural-gas sources. The residue produced from this process could be marketed as fertilizer, and the algae produced has potential use as a high-protein cattle feed.

**PB-296 515/0** **PC A06/MF A01**  
Peace Corps, Washington, DC.  
**The Araque Methane Gas and Fertilizer Plant**  
Project rept. no. 1  
Pat Doherty, Stan Huncilman, Max Kroschel, and Paul Warpeha. May 76, 118p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Methane, \*Fertilizers, \*Anaerobic processes, \*Organic compounds, Technology, Bacteria, Decomposition, Fermentation, Agricultural wastes, Sludge digestion, Heat treatment, Design criteria, Laboratory equipment, Pilot plants, Forecasting.  
Identifiers: \*Solid wastes, Araque(Ecuador), Manure, Developing country application.

The Araque Methane Gas and Fertilizer Plant Project, funded by the U.S. Agency for International Development and provided technical assistance by the Peace Corps, was conceived for the purpose of investigating the possibility of developing systems of anaerobic bacterial decomposition as a means of providing methane gas, as a fuel, and a high quality fertilizer product for the people of rural Ecuador. This project aimed at the production of methane gas for the ultimate production of bread in the community of Araque, Province of Imbabura, Ecuador. The report deals with the general technology of anaerobic bacterial decomposition and the production of the fuel and fertilizer products; history of the project describing the experimental work and the initial construction; problems encountered and the future of the project.

**PB-296 542/4** **PC A06/MF A01**  
Colorado Energy Research Inst., Golden.  
**Methane on the Move. A Discussion of Small Anaerobic Digesters**  
Final rept.  
Susan Schellenbach, Wayne Turnacli, Fred Varani, John L. Burford, Jr, and Shelley B. Don. Mar 77, 101p  
Contract FCRC-651366075  
Prepared in cooperation with Bio-Gas of Colorado, Inc., Loveland. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Methane, \*Anaerobic processes, \*Agricultural wastes, Design, Colorado, New

Mexico, Arizona, Utah, Nevada, Process charting, Feasibility, Performance evaluation, Cost analysis, Solid waste disposal, Fertilizers.  
Identifiers: \*Manures, Synthetic fuel, Manufactured gas, Developing country application.

This report is a discussion of small anaerobic digestion units, stimulated by experiments operated by Bio-Gas of Colorado. A grant from the Four Corners Regional Commission to the Colorado Energy Research Institute enabled Bio-Gas to build a 12 to 50 cow digestion unit on a trailer which could be pulled by a tractor to 19 different demonstration sites in Colorado, New Mexico, Arizona, Utah and Nevada. During this same period, Bio-Gas conducted laboratory experiments to determine yield coefficients of different manures and defined parameters to evaluate the economic feasibility of building digesters on a small or self-sufficiency scale. First the report describes the mobile digestion unit of 6,000 gallons with its start-up phases, operation, production and problems. Secondly, a discussion of the tour and a summary of the Journal in the Appendix tell how the digester performed and how it was received among the people who came to see the demonstration. Finally, the report includes designs for four different sizes of digesters based on data collected from the mobile unit, the tour and the laboratory, along with an order blank for shop drawings. A series of design tables which let interested persons easily size a digestion system and tailor it to their specific needs are included. The tables estimate gas production from a variety of manures and system sizes so the economics of the system can be studied.

**PB-296 567/1** **PC A04/MF A01**  
PERT Coordinating Group, Washington, DC.  
**PERT Guide for Management Use**  
Jun 63, 65p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*PERT, \*Network analysis(Management), Management methods, Operations research, Project planning, Decision making, Performance evaluation, Objectives, Time measurement, Scheduling, Coordination, Project management, Organization theory, Control charts.  
Identifiers: \*Program evaluation, Developing country application, Organizational communication.

PERT is a set of principles, methods, and techniques for effective planning of objective-oriented work thereby establishing a sound basis for effective scheduling, costing, controlling and replanning in the management of programs. The purpose of this document is to: establish a basic reference on management and PERT concepts as an improved communication system for all management levels; set forth PERT principles and methods for use by managers in the achievement of objective-oriented work; and to stimulate consistency in the regular application and use of PERT in the decision making process and maintain uniformity among government and industrial teams.

**PB-296 569/7** **PC A06/MF A01**  
United Nations Industrial Development Organization, Vienna (Austria).  
**National Approaches to the Acquisition of Technology**  
Development and transfer of technology series no. 1  
Marcus B. Finnegan. 1977, 120p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Licenses, \*Technology transfer, Government policies, Regulations, Technological intelligence, Commercial law, Technology assessment, Contract terms, Exports, Imports, Developing countries, Industries, Patents, Acquisition, International law.  
Identifiers: Developing country application.

The study is intended to discuss many of the principles, business practices, and laws that govern licensing, and, more generally, transfer of technology in the world at large. It includes an examination of broad principles and of specific problems in specific parts of the world.



**PB-296 570/5** PC A10/MF A01  
United Nations Industrial Development Organization, Vienna (Austria).  
**UNIDO Abstracts on Technology Transfer, Studies and Reports on the Development and Transfer of Technology (1970-1976)**  
Development and transfer of technology series no. 2.  
1977, 205p

Descriptors: \*Bibliographies, \*Abstracts, \*Technology transfer, Research, Subject indexing, Index terms, Documents, Technological intelligence, Technology innovation, Inventions, Information services.  
Identifiers: \*Research and development, Developing country application.

The report contains abstracts of selected documents on the subject of technology development and transfer. The report consists of two parts: a subject index, by title, and bibliographical abstracts. Only abstracts from 1970 onward using major descriptors in the computer program are included.

**PB-296 571/3** PC A03/MF A01  
United Nations Industrial Development Organization, Vienna (Austria).  
**The Manufacture of Low-Cost Vehicles in Developing Countries**  
Development and transfer of technology series no. 3.  
1978, 40p

Descriptors: \*Manufacturing, \*Vehicles, \*Developing countries, Ground vehicles, Cost engineering, Transportation, Marketing, Demand(Economics), Automotive industry, Automobiles, Automotive engineering, Government policies, Market surveys, India, Philippines, South Korea, Thailand, New Guinea.  
Identifiers: Developing country application.

The purpose of the study is to assist in promoting the manufacture and use of low-cost vehicles in developing countries. It is designed to assist government officials responsible for formulating policies on modes of transportation in their countries and businessmen concerned with the manufacture of various types of transport vehicles. It describes the main types of low-cost vehicles, what is involved in launching their manufacture, and aspects of marketing them. It reviews recent developments in several Asian countries, with particular emphasis on India and the Philippines, where low-cost vehicles have significantly penetrated the market. Annexes provide a descriptive listing of types of low-cost vehicles with names and addresses of manufacturers.

**PB-296 572/1** PC A08/MF A01  
United Nations Industrial Development Organization, Vienna (Austria).  
**Technology for Solar Energy Utilization**  
Development and Transfer of Technology series no. 5.  
Hans Kleinrath, V. G. Bhide, and Jean Paul Durand. 1978, 160p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Technology transfer, \*Solar energy, Electric power generation, Solar power generation, Swimming pools, Greenhouses, Kilns, Refrigeration, Space heating, Water heaters, Air conditioning, Crop driers, Utilization.  
Identifiers: Solar water pumps, Solar collectors, Flat plate collectors, Solar space heating, Solar water heaters, Solar air conditioning, Solar stills, Solar drying, Solar cooking, Developing country application.

This report discusses work being done in various countries and institutions, and contains 17 technical papers dealing with the conversion of solar energy into mechanical or electrical energy, the design of solar collectors, the utilization of solar energy in heating, cooling, distillation, drying and cooking, and the transfer of technology.

**PB-296 573/9** PC A05/MF A01  
United Nations Industrial Development Organization, Vienna (Austria).  
**Audio-Visual Techniques for Industry**  
Development and transfer of technology series no. 6  
John Halas, and Roy Martin-Harris. 1978, 92p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Specialized training, \*Developing countries, \*Visual aids, Industries, Utilization, Manuals, Films, Display devices, Learning.  
Identifiers: Developing country application.

The manual has been designed for persons in developing countries responsible for initiating or expanding the use of audio-visual facilities and techniques in industry in the hope that it will help them to improve their presentations through the use of some basic techniques. It is designed for the person in developing countries who has little or no background in audio-visuals but needs detailed information about how he can use these techniques in an economical, efficient way, taking into consideration his own local conditions. Annexes are provided which contain standard technical information that is frequently requested.

**PB-296 574/7** PC A03/MF A01  
United Nations Industrial Development Organization, Vienna (Austria).  
**Technologies from Developing Countries**  
Development and transfer of technology series, no. 7.  
1978, 46p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Technology, \*Developing countries, Information systems, Data acquisition, Industries.  
Identifiers: Developing country application.

The volume provides information on 138 technologies from developing countries. Under each heading a brief description of the technology and its distinctive features are given. Heading technologies include plants and plant products; animal products; food industry; leather; wood, pulp, and paper; textiles; energy; chemicals; plastics; construction; metals; and machinery.

**PB-296 575/4** PC A04/MF A01  
United Nations Industrial Development Organization, Vienna (Austria).  
**Process Technologies for Phosphate Fertilizers**  
Development and transfer of technology series no. 8  
K. R. Krishnaswami. 1978, 57p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Inorganic phosphates, \*Fertilizers, Process charting, Sulfuric acid, Phosphoric acid, Cost analysis.  
Identifiers: Ammonium phosphates, Ammonium phosphate sulfates, Ammonium nitrate phosphates, Ammonium phosphate urea, Developing country application, Phosphate/nitro.

The most important processes used for making phosphate fertilizer materials are summarized in this document. A guide is provided to the selection of process technologies for developing countries interested in initiating efforts in this sector. The processes for a given product are grouped together, and in every case the following information is given: description of the process operations; flow chart; advantages and disadvantages relative to the other processes in the same section; owner, in the case of proprietary processes; and engineering licenses, if any. More details about the processes can be found in the publications listed in the bibliography and from the firms named in the description, whose addresses are given in the annex.

**PB-296 576/2** PC A04/MF A01  
United Nations Industrial Development Organization, Vienna (Austria).  
**Process Technologies for Nitrogen Fertilizers**  
Development and transfer of technology series no. 9

V. S. Pillai. 1978, 74p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Fertilizers, \*Nitrogen, Process charting, Ammonia, Urea, Ammonium sulfate, Ammonium halides, Nitric acid, Ammonium nitrate, Sodium nitrates, Potassium nitrate, Cost analysis.  
Identifiers: Ammonium chloride, Ammonium nitrate sulfates, Ammonium calcium nitrates, Developing country application.

The most important processes used for making nitrogen fertilizer materials are summarized in this document. A guide is provided to the selection of process technologies for developing countries interested in initiating efforts in this sector. The processes for a given product are grouped together, and in every case the following information is given: description of the process operations; flow chart; advantages and disadvantages relative to the other processes in the same section; owner, in the case of proprietary processes; and engineering licenses, if any. More details about the processes can be found in the publications listed in the bibliography and from the firms named in the description, whose addresses are given in the annex.

**PB-296 577/0** PC A04/MF A01  
United Nations Industrial Development Organization, Vienna (Austria).  
**Brickmaking Plant: Industry Profile**  
Development and transfer of technology series no. 10  
Ian Knizek. 1978, 64p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Brick industry, \*Manufacturing, \*Industrial plants, Production methods, Equipment, Bricks, Cost analysis, Fixed investment, Manpower, Requirements, Raw materials, Operating costs, Profits, Losses, Marketing, Transportation, Kilns, Energy, Utilities.  
Identifiers: Developing country application.

The document presents basic information on all the important parameters involved in setting up and running a mechanized brickmaking plant. The study discusses the available processes; main equipment involved; material used; space, energy and utilities; manpower (number and type) needed for a given capacity; the size of the investment for a specific production; and an idea of product costs.

**PB-296 578/8** PC A04/MF A01  
United Nations Industrial Development Organization, Vienna (Austria).  
**Technological Profiles on the Iron and Steel Industry**  
Development and transfer of technology series no. 11  
G. P. Mathur. 1978, 55p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Iron and steel industry, \*Technology, Profiles, Technological intelligence, Iron ore deposits, Production, Reserves, Beneficiation, Agglomeration, Iron ores, Steel making, Steel castings, Tables(Data).  
Identifiers: Developing country application.

The report contains four sections: (1) World Iron Ore Survey; (2) Ironmaking; (3) Steelmaking; and (4) Steel Casting.

**PB-296 581/2** PC A03/MF A01  
Woods Hole Oceanographic Institution, MA.  
**Fisheries Policy and the Underdevelopment of Inshore Pacific Mexico**  
Technical rept.  
James R. McGoodwin. Apr 79, 47p Rept no. WHOI-79-44  
Grant NOAA-04-8-M01-149  
Sponsored in part by Pew Memorial Trust, Philadelphia, PA.

Descriptors: \*Shrimps, \*Fisheries, \*Mexico, Management, Exports, Industries, Developing countries, Rural areas, Coasts, Income, Growth, Archaeology, Food processing.  
Identifiers: Sinaloa(Mexico), Cooperatives.



Development of shrimp-export industry brought about the underdevelopment of Pacific Mexico's inshore fisheries. The rural fishery of south Sinaloa provides a case in point, as well as a point of departure for considering fisheries development and management policy for similar fisheries in certain other less developed countries.

**PB-296 582/0** **PC A06/MF A01**  
United Nations Educational, Scientific and Cultural Organization, Bangkok (Thailand). Library.  
**Appropriate Technology: A Bibliography of Books and Other Materials**  
Nov 78, 113p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Bibliographies, \*Developing countries, \*Technology, Subject index terms, Technology transfer, Methodology, Asia.  
Identifiers: Developing country application.

Listed in this bibliography are 409 titles on village or intermediate technology which have been tried and tested. An index contains 417 subjects on which information may be obtained. Addresses and sources for obtaining these documents are given at the end of the bibliography.

**PB-296 635/6** **PC A08/MF A01**  
National Technical Information Service, Springfield, VA. Developing Country Staff.  
**Global Listing of Appropriate Technology Organizations and Sources**  
Paul Bundick. 1979, 169p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Technology assesment, \*Organizations, \*Directories, Research, Technical societies, Scientific societies, States(United States), Foreign countries, Sources, Technology innovation, Technological intelligence, Information centers.  
Identifiers: International organizations, National organizations, Research and development, Developing country applications, Information dissemination.

The directory is a comprehensive listing of addresses of worldwide organizations, research institutes, and development groups involved in some aspect of appropriate technology. The list was compiled in 1978 from numerous sources. It is organized alphabetically by region, country, and organization. The United States is arranged according to states. This is only a listing of addresses and is not intended to be a guide to the specific activities of each appropriate technology source.

**PB-296 654/7** **PC A03/MF A01**  
Intermediate Technology Development Group, London (England).  
**Metodos Simples para Fabricar Velas (Simple Methods of Candle Manufacture)**  
c1975, 29p Rept no. ISBN-0-903031-49-3

Descriptors: \*Manufacturing, \*Candles, Processing, Equipment, Guidelines, Developing countries, Casting, Drawing, Dipping, Pouring.  
Identifiers: Developing country application.

Dipping, pouring, casting, drawing—all these basic candle-making processes are described in detail in this guide. For each process a list of equipment that is needed is included; whenever possible, readily available tools and techniques are substituted for more expensive commercial products. Numerous drawings and diagrams illustrate the text.

**PB-296 720/6** **PC A03/MF A01**  
Food and Agriculture Organization of the United Nations, New York.  
**La Erosion y Su Control (Erosion and Its Control)**  
Pieter Van Ginneken, and Jose Ramon Mora.  
Jan 78, 29p

Descriptors: \*Soil erosion, \*Erosion control, \*Developing countries, Soils, Classifications, Channel stabilization, Ditches, Vegetation, Retaining walls, Farms.

Identifiers: Developing country application.

This introductory report describes three different types of erosion, their causes, and methods used to control erosion and preventative treatments of the soil. These are described step by step, and applicable diagrams are included, e.g. the construction of drainage channels and ditches, depending on the type and steepness of the soil; different terracing methods; types of vegetation beneficial to the prevention of erosion, especially for the prevention of slides and the building of retaining walls. The report is suited to the available resources in underdeveloped countries, and is primarily for use by farmers and small communities interested in improving the condition of the land. It is by no means a technical treatise.

**PB-296 721/4** **PC A03/MF A01**  
Centro Cooperativo Tecnico Industrial, Tegucigalpa (Honduras).  
**Estudio Tecnico-Economico para la Fabricaion de Cal en Honduras (Technical-Economical Study on the Production of Lime in Honduras)**  
1956, 43p

Descriptors: \*Industrial plants, \*Calcium oxides, Manufacturing, Mines(Excavations), Plant location, Fuel consumption, Marketing, Plant layout, Kilns, Cost estimates, Market surveys, Honduras.  
Identifiers: Lime, Developing country application.

The study examines the development of lime production in Honduras, the traditional and possible future uses of lime. It also describes the location of the quarries and their geological origin. Included is a design for a limestone plant using available fuel to the best advantage, the most desirable location of such a plant in relation to the availability of limestone deposits, fuel sources, and marketing. In addition, construction layout and a model for an efficient lime kiln is provided. Analysis of different sources of limestone, operating cost efficiency, local markets, estimated consumption, and export analyses are covered. Text in Spanish.

**PB-296 722/2** **PC A04/MF A01**  
Agency for International Development, Washington, DC.  
**Evaluacion Comparativa Entre Paises de Organizaciones de Pequenos Agricultores (Comparative Evaluations between Countries with Small Farmer Organizations and Their Programs, Ecuador, Honduras)**  
Final rept.  
Judith Tendler. Nov 76, 73

Descriptors: \*Cooperation, \*Agriculture, \*Credit, Rural areas, Farm management, Financing, Economic development, Ecuador, Honduras, Federal assistance programs.  
Identifiers: \*Cooperatives, Rural development, Financial support.

Nine different AID programs are discussed directed to small farmer organizations in Ecuador and Honduras. Two of these programs deal with the organization of credit cooperatives. Other programs are discussed which deal with commercial cooperatives and the creation of private cooperatives and a central office for the assistance of cooperatives in the public sector. Factors that contribute to the success or failure of these programs, recommendations on what course AID should follow, inter-agency coordination in rural development programs, and the economic and political aspects of the above programs are presented.

**PB-296 916/0** **PC A03/MF A01**  
Agency for International Development, Washington, DC.  
**Progres et Perspectives de la Production Alimentaire (Progress and Prospects for food Production)**  
F. W. Parker. 1956, 31p

Descriptors: \*Production, \*Food, \*Developing countries, United States, Comparison, Mexico, Brazil, India, Yugoslavia.  
Identifiers: Developing country application.

Food Production in developing countries is compared with that in developed countries, principally

the United States. Mexico, Brazil, India, and Yugoslavia provide statistics as sample developing countries. Use of fertilizers and pesticides is discussed, conditions for progress outlined, and prospects for improvement mentioned.

**PB-296 917/8** **PC A04/MF A01**  
Soil Conservation Service, Washington, DC.  
**Petit Manuel de Conservation des Eaux et du Sol (Teaching Soil and Water Conservation)**  
Albert B. Foster, and Adrian C. Fox. 1966, 58p

Descriptors: \*Soil conservation, \*Water conservation, \*Soil erosion, Visual aids, Manuals, Education, Sediments, Soil properties, Soil texture, Cultivation, Plants(Botany), Irrigation, Vegetation, Leguminous plants, Mulches, Slopes.  
Identifiers: Developing country application.

Techniques for presenting graphic visual demonstrations that explain how soil is formed and eroded are described in detail. Methods to teach conservation practices with equal visual proof by demonstration are then given in a systematic manner that can help community leaders or agricultural extension workers teach basic conservation.

**PB-296 918/6** **PC A06/MF A01**  
Agricultural Research Service, Washington, DC.  
**Les Maladies de la Tomate: Prophylaxie et Traitement (Tomato Diseases and Their Control)**  
S. P. Doolittle, A. L. Taylor, and L. L. Danielson.  
1960, 123p

Descriptors: \*Tomato plants, \*Plant diseases, Bacteria, Mushrooms, Viruses, Nematoda, Pest control, Recommendations.  
Identifiers: Developing country applications.

Forty three separate tomato diseases are covered including maladies caused by bacteria, mushrooms, viruses, nematodes, and unknown agents. General methods for controlling all these diseases are given and a helpful section listing the various symptoms of tomato diseases is included for easy identification of what problem is affecting your crop.

**PB-296 964/0** **PC A02**  
California Univ., San Diego, La Jolla. Dept. of Anthropology.  
**Successful Mexican Tuna Cooperatives: A Model for U.S. Fishermen**  
John S. Petterson. Mar 79, 15p NOAA-79051504  
Grant NOAA-04-7-158-44121  
Microfiche copies only.

Descriptors: \*Tunas, \*Organization, Fishing, Mexico, United States.  
Identifiers: Sea Grant program, Cooperatives.

Some of the means by which Mexican tuna cooperatives have been able to successfully adapt to physical and social conditions are identified. The difference between the successful adaptation of the Mexican cooperatives and the less than successful adaptation of many U.S. fishing cooperatives has been a product of the complex interaction of numerous historical and cultural variables. Although conditions in Mexico and the United States are not directly parallel, some of the mechanisms employed by the Mexican fisherman in adapting to changing conditions could prove useful to U.S. fishermen in solving their own problems.

**PB-296 995/4** **PC A12/MF A01**  
Philippines Univ., Diliman, Quezon City. Inst. for Small Scale Industries.  
**Annotated Bibliography of Institute Reports**  
1978, 254p Rept no. IID-780425  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Bibliographies, \*Management, \*Industries, \*Technology, Philippines, Manufacturing, Commerce, Crafts, Automation, Technological intelligence, Production methods, Industrial engineering, Market research, Market surveys, Auditing, Technology assessment, Businesses, Subject indexing.  
Identifiers: Case studies, Developing country application.



The bibliography contains reports on the following topic areas: Management operations of existing trading, handicrafts and manufacturing industries in the Philippines; Low-cost automation and adaptive technology; Production processes and requirements; and market possibilities in particular.

**PB-297 043/2** **PC E13/MF E13**  
Solar Energy Information Services, San Mateo, CA.

**Engineer's Guide to Solar Energy**  
Yvonne Howell, and Justin A. Bereny. cFeb 79, 330p\* Rept nos. SEIS-79/1, ISBN-0-930978-04-8 Library of Congress catalog card no. 78-62956

Descriptors: \*Solar energy, \*Manuals, Solar power generation, Solar cells, Photovoltaic cells, Solar radiation, Biomass, Wind power generation, Heat storage, Swimming pools, Heat pumps, Space heating, Buildings, Heat loss, Heating load, Cooling load, Design, Performance, Thermal efficiency, Cost analysis, Bibliographies, Dictionaries, Industries, Directories, Photographs, Drawings, Systems engineering, Tables(Data).  
Identifiers: Solar space heating, Solar water heating, Ocean thermal energy conversion, Passive solar heating systems, Solar collectors, Flat plate collectors, Concentrating collectors, Solar air conditioning, Solar cooling systems, Solar heating systems, Solar power plants.

The Engineer's Guide to Solar Energy is designed to enable professionals in any field of engineering, architects, builders, and tradesmen to develop a working knowledge of solar heating technology. It is also designed to serve as a basic textbook to introduce college students to the field of solar energy. The Guide, organized into 13 basic chapters, offers vital and up-to-date information on the following subjects: (1) An overview of the six basic solar technologies; (2) a comprehensive discussion of the solar resource, including a compendium of worldwide solar radiation data; (3) an introduction to passive solar technology; (4) extensive discussion of active solar systems, including applications for heating swimming pools, domestic hot water, and space heating; (5) methodology for calculating building heat loss and gain, including worldwide design temperature data; (6) an introduction to solar systems sizing through utilization of the f-chart method, including examples and worksheets; (7) a Solar Heating Product Directory divided into four sections: collectors, controls, pumps, and storage; (8) an Annotated Bibliography highlighting significant solar heating literature, including program and planning documents published by the U.S. Government; (9) a four-part Solar Dictionary consisting of: glossary, acronyms, nomenclature and conversion factors (English to metric SI units). Copyright (c) 1979 by Solar Energy Information Services.

**PB-297 072/1** **PC A02/MF A01**  
Inter-Univ. Consortium for International Development, Columbia, MO.  
**Trickle-Up Development Through Aided Self-Employment**  
Glen Leet. 12 Mar 79, 21p  
Paper presented at the Comparative Social Development State of the Art Conference, Held at Columbia, MO. on October 30, 1978. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Community development, \*Employment, Productivity, Developing countries, Rural areas, Return on investment, Low income groups.  
Identifiers: Developing country application, Poverty groups.

The document is designed to stimulate growth with equity by involving the poorest of the poor in productive self-help. The process described has encouraged over 97 million days of community service on activities planned by people for their collective benefit. Programs are cited in Greece, the Republic of Korea, and a continuing program in Mexico spanning 15 years in over 20,000 communities.

**PB-297 073/9** **PC A04/MF A01**  
National Bureau of Standards, Washington, DC.

**Industrial Research and Science and Technology for Development. A Workshop in Preparation for the 1979 U.S. Conference**

Raymond C. Sangster, and B. K. Wesley  
Copeland. 1978, 62p  
Contract AID-DSAN-147-641  
Prepared in cooperation with International Science and Technology Inst., Inc., Washington, DC. Results of a conference, Held in Arlington, Virginia, on November 8-9, 1978.

Descriptors: \*Research, \*Technological intelligence, \*Developing countries, Technology assessment, Technology transfer, Industries, Economic development, Organizations, Meetings.  
Identifiers: \*Industrial technology, \*Research and development, Developing country application, Scientific research.

The results of a Workshop are provided in the booklet. The Workshop participants, consisting of senior research managers from 21 U.S. corporations, nationals of several countries, and representatives from five Federal agencies and several non-profit organizations, met to discuss the fundamental issues affecting the present and potential linkages between corporate R&D organizations and the developing countries.

**PB-297 074/7** **PC A02/MF A01**  
International Society for Community Development.  
**Aided Self-Employment as a Means of Enabling the Poorest of the Poor to Contribute to Development**

Glenn Leet. 25 Aug 78, 25p  
Paper presented at International Conference of the International Society for Community Development, Held at Jerusalem, Israel on August 25, 1978. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Employment, \*Disadvantaged groups, Management training, Economic development, Motivation, Greece, Korea, Mexico, Personnel development, Capital, Projects, Government policies, Investments.  
Identifiers: \*Self help programs, Developing country application, Self actualization.

The paper is based upon the recognition of the capacity of people to think, plan, and work together, and upon the realization that as they achieve some of their hopes and aspirations, they contribute to the greater self-reliance of their communities and their nations. Programs in Mexico, Korea, and Greece are cited.

**PB-297 075/4** **PC A08/MF A01**  
Bureau of Employment Security, Washington, DC.  
**Techniques for Determining Manpower Skill Needs and Training Requirements**  
May 63, 156p AID/GM-6

Descriptors: \*Manpower, \*Abilities, \*Requirements, \*Specialized training, Education, Manpower utilizations, Skilled workers, Unskilled workers, Job analysis, Labor estimates, Reporting.  
Identifiers: \*Training, Developing country application, Skill development, Skilled labor.

The handbook includes methods for determining current skill needs and for introducing a continuing program of manpower reporting. Part I discusses manpower planning in obtaining information designed to meet the particular economic developments of the area it describes. Part II covers area manpower surveys to assist and support economic development in producing estimates of current and future manpower requirements in selected or in all occupations and by ascertaining the education and training needs to satisfy manpower requirements. Part III focuses on occupational guides for determining worker-job relationships in a particular occupation or group of occupations. Worksheets are included for compiling data.

**PB-297 076/2** **PC A04/MF A01**  
Organization for Economic Co-Operation and Development, Paris (France).  
**Methods of Project Appraisal in Developing Countries**  
Andre Bussery. Mar 73, 68p

Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Project management, \*Evaluation, \*Developing countries, Performance evaluation, Cost effectiveness, Guidelines, Methodology, Accounting, Prices, Employment, Income, Discounted cash flow, Convergence, Divergence, Political science, Economic analysis.  
Identifiers: Developing country application.

The document reviews and compares the different methods used for the appraisal of projects in developing countries. The convergencies and divergencies of the various methods are shown as well as the principle practical or theoretical problems arising from their use within the developing countries.

**PB-297 077/0** **PC A04/MF A01**  
World Health Organization, Geneva (Switzerland).  
ATH Programme.  
**Appropriate Technology for Health Directory**  
Apr 78, 51p Rept no. ATH-78.1

Descriptors: \*Directories, Research, Indexes(Documentation), Foreign countries.  
Identifiers: \*Health care technology, Developing country application, Health services research, Subject indexes.

The directory contains the names and addresses of 210 people who are involved in the field of appropriate technology health (ATU). The listings are alphabetical by country. A subject index is included.

**PB-297 078/8** **PC A05/MF A01**  
National Project in Agricultural Communications, East Lansing, MI.  
**Visuals in Agricultural Extension Programs**  
Robert J. Ames, George H. Axinn, Landis S. Bennett, and Ellis Clough. Jul 67, 92p  
Sponsored in part by International Cooperation Administration, Washington, DC. Office of Food and Agriculture.

Descriptors: \*Agricultural economics, \*Specialized education, \*Visual aids, Instructional materials, Handbooks, Training devices, Education, Farm management.  
Identifiers: \*Rural extension, Developing country applications.

The handbook is for those who are engaged in the world-wide movement of improving agricultural efficiency through extension education. The value and use of visuals in teaching new ideas is emphasized. Many useful visual aids are presented for communicating new methods.

**PB-297 079/6** **PC A02/MF A01**  
National Science and Technology Development Agency, Lagos (Nigeria).  
**Educating Farmers Through the Mass Media**  
Oyeniyi Akande. 1978, 17p  
Paper presented at National Seminar on Transfer of Research Results in Agriculture, Held at Ibadan, Nigeria, on November 21-24, 1978. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Mass media, \*Education, \*Agriculture, Mass communication, Research, Production, Yield, Technological intelligence, Agriculture engineering.  
Identifiers: \*Rural extension, \*Information dissemination, Developing country application, Scientific research, Farmers.

The paper explores the role of the mass media (newspapers, magazines, radio, and television) in assisting the agricultural research workers to get their findings across to the ultimate users--the farmers who have to adopt the new techniques in order to improve their yields.

**PB-297 085/3** **PC A04/MF A01**  
Georgia Inst. of Tech., Atlanta. Economic Development Lab.



## **Bibliography of Intermediate Technology Materials Held at the International Development Data Center**

Kay Ellen Auciello. 1976, 62p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Bibliographies, \*Technological intelligence, \*Technology assessment, Technology transfer, Information centers, Developing countries, Utilization, Adaptation, Subject indexing.  
Identifiers: Developing country application.

The document lists various publications concerned with the subjects of technology selection and adaptation for particular situations in developing countries. It contains reports, papers, articles, monographs, and serials that devote substantial coverage to various aspects of intermediate technology. The publications are arranged by broad subject categories and entered alphabetically by author. Publications listed are those as of January 1976 in the IDDC collection.

**PB-297 086/1** **PC A03/MF A01**  
Oregon State Univ., Corvallis. Agricultural Experiment Station.  
**Secondary Benefits and Irrigation Project Planning**

Norman D. Kimball, and Emery N. Castle. May 63, 37p Rept no. TECHNICAL BULL-69  
Prepared in cooperation with Department of Agriculture, Washington, DC. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Irrigation, \*Developing countries, Project planning, Benefit cost analysis, Marketing, Agricultural economics, Businesses, Oregon.  
Identifiers: Developing country application, Jefferson County(Oregon).

This manuscript presents the conclusions developed on an intensive research study of the experience of an irrigation project. The project known as the North Unit Deschutes Irrigation Project is located in Jefferson County, Oregon, and was developed by the Bureau of Reclamation. The purpose of this report is to state the principal theoretical issues and to present measures of secondary benefits. The study is also concerned with project planning.

**PB-297 087/9** **PC A02/MF A01**  
Hotline International, New York.  
**The Augmentation of International Conferences Through Computer Communications**  
Glen Leet, and Mildred Robbins Leet. 7 Jun 78, 19p  
Sponsored in part by Agency for International Development, Washington, DC. Paper Presented at Session on Computer-Based Document Distribution, National Computer Conference, 1978, Held at Anaheim, California.

Descriptors: Meetings, Computer networks, International relations, Telecommunication.  
Identifiers: \*Computer conferencing, \*Computer communications, Conferences, Developing country application.

Reported in this paper is the impact of computer communication technologies on the dissemination of information at international conferences. Many advantages to computer communication technologies are cited in this document.

**PB-297 144/8** **PC A04/MF A01**  
Mochudi Farmers Brigade, Botswana.  
**Mochudi Tool Bar (Makgonatsotlhe)**  
Feb 75, 54p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Tools, \*Agricultural machinery, \*Developing countries, Drawings, Loads(Forces), Wheels, Cultivation, Bars, Savings, Africa.  
Identifiers: Developing country application, Botswana Republic(Africa), Tool bars.

The Mochudi Farmers Brigade is a project of the Kgatleng Development Board which is a non-governmental development agency, dedicated to the

development of Botswana and its peoples, particularly the rural sector. For a number of years it has been working to develop and perfect a multi-purpose farming implement suited to local conditions. In building simple tools for draught animals the wheels on which the implement is supported represent the single largest investment in materials, therefore, if the same set of wheels can be used for many functions it should be possible to limit the cost of necessary tools by making one set of wheels carry out many operations. After several years of testing, the Mochudi Toolbar has been perfected so that it is possible to perform all the necessary operations of conventional tillage systems as well as many unconventional operations. This booklet contains a complete set of scale drawings for the Toolbar and its various components.

**PB-297 179/4** **PC A03/MF A01**  
United Nations Industrial Development Organization, Vienna (Austria).  
**International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Agricultural Machinery Industry and Rural Industrialization in the Sudan**  
Background paper  
M. Abdelkarim Bedri. 13 Oct 78, 46p  
Report of Working Group No. 7, Appropriate Technology for the Production of Agricultural Machinery and Implements. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Industries, \*Agricultural machinery, \*Sudaw, Agriculture, Government policies, Planning, Production, Tractors, Cooperation, Machinery, Developing countries, Africa.  
Identifiers: Developing country application.

The paper deals with the present status and future development in the agricultural machinery industry in Sudan. Both technical and economic aspects relating to the issue of the agricultural machinery industry are discussed. An annex and bibliography are included.

**PB-297 180/2** **PC A04/MF A01**  
United Nations Industrial Development Organization, Vienna (Austria).  
**International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technologies for Small-Scale Production of Cement and Cementitious Materials**  
Background paper  
R. J. S. Spence. 13 Oct 78, 69p  
Prepared by Intermediate Technology Development Group, London (England). Report of Working Group. No. 5, Appropriate Technology for the Production of Cement and Building Materials. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Construction materials, \*Cements, \*Manufacturing, Portland cement, Technology, Comparison, India, Kilns, China, Indonesia, Structural clay products, Gypsum, Calcium oxides, Developing countries, Great Britain.  
Identifiers: Developing country application.

The report discusses small scale cement production, and the characteristics and problems in existing cement-production technology. The report covers small-scale Portland plants; lime-based cementing materials; other cementing materials such as hydraulic lime and natural cement and gypsum, and describes other cement-making processes.

**PB-297 203/2** **PC A04/MF A01**  
United Nations Industrial Development Organization, Vienna (Austria).  
**International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Medicine for the Rural Population in India**  
Background paper  
R. N. Goel. 6 Oct 78, 53p  
Report of Working Group. No. 2, Appropriate Technology for the Manufacture of Drugs and Pharmaceuticals. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Medicine, \*India, Drugs, Rural areas, Distribution systems, Quality control, Investments, Drug industry, Medical services, Developing countries.  
Identifiers: Developing country application.

The document presents ways of providing simple medicaments to the rural population in India. The suggestions are also applicable to rural areas of other developing countries with suitable modifications. The topics covered are indigenous system of medicine, allopathic home remedies, quality control, distribution systems, capital investments and financial projection, socio-economic benefits, and the present position of the drug industry in India.

**PB-297 205/7** **PC A02/MF A01**  
United Nations Industrial Development Organization, Vienna (Austria).  
**International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Preservation of Vegetables in the Republic of Korea: The Processing of Kimchi**  
Background paper  
D. H. Shin. 13 Oct 78, 25p  
Report of Working Group No. 6, Appropriate Technology for Food Storage and Processing. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Food processing, \*Vegetables, \*Korea, Preservation, Food storage, Storage life, Microorganisms, Fermentation, Developing countries.  
Identifiers: Developing country application.

Kimchi, spiced and lactic acid fermented vegetables, has traditionally been one of the most important side dishes for the daily meals of the Korean people. It is prepared by salting Chinese cabbages and/or radishes, washing the salted vegetables with fresh water, adding spices and seasoning to them, and then leaving the spiced vegetables to undergo a process of natural lactic acid fermentation. The document discusses microorganisms in kimchi fermentation; changes in properties of kimchi under fermentation; and how to extend storage life of kimchi.

**PB-297 226/3** **PC A03/MF A01**  
United Nations Industrial Development Organization, Vienna (Austria).  
**International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Creation of Small-Scale Industry Development in Southern Sweden - The Gnosjo Case**  
Background paper  
Magnus Hult, and Goran Odeen. 25 Sep 78, 29p  
Prepared by Swedish International Development Authority, Stockholm. Report of Working Group No. 8, Appropriate Technology for Light Engineering Industries and Rural Workshops. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Industries, Statistical data, Economic development, Manufacturing, Employment, Economic factors, Sweden.  
Identifiers: \*Industrial development, Developing country application.

The Smaland commune Gnosjo is a region which has had an extremely positive economic development during the 20th century. Gnosjo's economy is highly dependent upon a large number of small-scale industries primarily in the light manufacturing sector. Unemployment is very low. This paper analyzes Gnosjo as a practical case for an analysis model to provide an understanding of the reasons behind the positive economic development of a region.

**PB-297 227/1** **PC A05/MF A01**  
United Nations Industrial Development Organization, Vienna (Austria).  
**International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. The Pharmaceutical Industry of the Republic of Korea**  
Background paper  
S. S. Jun. 13 Oct 78, 93p



Report of Working Group No. 2, Appropriate Technology for the Manufacture of Drugs and Pharmaceuticals. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Drug industry, \*Korea, Development, Manufacturing, Economic development, History, Technology, Foreign aid, Public health, Insurance, Developing countries.  
Identifiers: Developing country application.

The study has been organized into seven chapters to cover the topics essential for examining the Korean historical experience in an effort to determine what factors aided and/or hindered the pharmaceutical industrial development. The main topics cover the pre-war era; the post war era; the era of economic development plan; the present; and public health and medical insurance. Tables of statistics are provided to understand the past and the present status.

**PB-297 239/6** **PC A03/MF A01**  
United Nations Industrial Development Organization, Vienna (Austria).  
**International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Technology Planning Factors in the Cane Sugar Industry**  
Background paper  
M. H. Tantawi. 27 Oct 78, 33p  
Report of Working Group No. 4, Appropriate Technology for the Production of Sugar. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Food industry, Sugar crops, Industrial plants, Production capacity, Machinery, Molasses, Bagasse, Processing, Production methods, Requirements, Developing countries.  
Identifiers: Developing country application, \*Sugar industry.

The document briefly discusses factory size and location, operations and processing requirements machinery and capacity of production.

**PB-297 240/4** **PC A03/MF A01**  
United Nations Industrial Development Organization, Vienna (Austria).  
**International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology in the Construction and Building Materials Industry**  
Background paper  
G. Sebestyen. 5 Oct 78, 28p  
Report of Working Group No. 5, Appropriate Technology for the Production of Cement and Building Materials. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Construction industry, \*Construction materials, \*Technology, Manufacturing, Technology assessment, Developing countries, Agreements, Cooperation, Policies, Meetings.  
Identifiers: Developing country application.

In recent years the construction and building materials industry in less developed countries has become more and more important. Hence it should be awarded second priority after the food and agro industries. In construction there are several sub-sectors: international modern, domestic modern and traditional and small scale. Appropriate technologies are different for these subsectors. For the modern subsector technologies used in developed countries can be appropriate, however, in many cases production on a smaller scale and a lower degree of mechanization is justified. In the building materials industry too production often is to be organized on a smaller scale (cement, lime, gypsum, etc.). It is important to develop the manufacture and use of local materials (stone etc.) and of industrial and agricultural wastes. Industrialization on various levels leads to an increased effectiveness of the construction and building materials industry, this being a prerequisite to increased outputs in new housing, new industrial complexes and the construction of better national and urban infrastructures (transport systems, etc.). Governments should devote particular attention to the development of the construction and building materials industry, including the choice of appropriate technology,

in order to promote economic development and the welfare of the population.

**PB-297 241/2** **PC A02/MF A01**  
United Nations Industrial Development Organization, Vienna (Austria).  
**International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Choice of Appropriate Construction Technology in the Building Industry in Iran**  
Background paper  
F. Neghabat. 5 Oct 78, 24  
Report of Working Group No. 5, Appropriate Technology for the Production of Cement and Building Materials. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Construction industry, \*Iran, Technology, Urban areas, Houses, Rural areas, Construction materials, Economic factors, Policies, Developing countries, Prefabrication, Statistical data.  
Identifiers: Developing country application.

An attempt has been made to present the status of construction industry in Iran. Statistics are given reflecting urban housing types, numbers existing and planned, the status of building materials and the extent of industrialization of building industry is presented. Comparisons have been made between the two categories of indigenous and imported Western technologies. Factors most important in evaluating alternative construction techniques are discussed. It is shown that the choice of appropriate technology whether indigenous or imported depends on the specifics of the project and its suitability to local conditions. The economical, labor, technical, and managerial factors, as well as the adaptability of the region to new technology is stressed. The appropriateness of indigenous technology to rural housing, and the applicability to specific project of total, partial or on-site prefabrication is described. Finally, the establishment of component industries as a foundation for a stable, equilibrium condition in building industry is emphasized.

**PB-297 242/0** **PC A04/MF A01**  
United Nations Industrial Development Organization, Vienna (Austria).  
**International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Building Materials and Components**  
Background paper  
J. P. M. Parry. 5 Oct 78, 53p  
Prepared by Intermediate Technology Development Group, London (England). Report of Working Group No. 5, Appropriate Technology for the Production of Cement and Building Materials. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Construction materials, \*Cements, \*Developing countries, Reinforcement(Structures), Roofs, Bricks, Tiles, Construction industry, Brick industry, Meetings, Africa, Great Britain.  
Identifiers: Developing country application, Villages.

The paper considers important aspects of the economics and technology of the construction sector in less developed countries especially in Africa. It then applies the lessons drawn from the analysis to suggest future policies. The design and erection of buildings to fit their purpose and the industrial manufacture of building materials are different types of activity but strongly influence each other. The earlier parts of the discussion concentrate on aspects of design from which stem particular requirements for building materials and components. Some traditional low cost ways of extending the life expectancy of normally non durable structures are briefly reviewed in the context of an examination of the normal agents of decay in buildings. Information is provided of one new manufacturing system, a technique for making low cost fibre reinforced cement roof sheets by hand which is suitable for village-scale industries. A fairly detailed examination is made of the one building product which is manufactured extensively in small scale plants--burnt clay bricks. Aspects of the brickmaking

technologies and operating set-ups are examined to try to determine what features have made them so resilient. Discussion of rural brickmaking is concluded in an assessment on how it could be improved technically so as to serve its market with better quality products in manufacturing plants which use resources more efficiently, are less vulnerable to seasonal changes and provide a better operating environment for the workforce. The argument is then broadened using information on the strengths and weaknesses of the rural brick and tile industries to give guidance on how other forms of building material manufacture could be encouraged. Finally the question is explored of how rural employment and prosperity through expanded building materials manufacture, could be aided by institutional assistance through public sources. The paper concludes with a description of actions and programs which in the light of the technical and commercial findings, might be considered for implementation on an international scale.

**PB-297 258/6** **PC A03/MF A01**  
United Nations Industrial Development Organization, Vienna (Austria).  
**International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Construction and Building Materials Industry in the United Republic of Cameroon**  
Background paper  
E. K. Mundi. 5 Oct 78, 26p  
Report of Working Group. No. 5, Appropriate Technology for the Production of Cement and Building Materials. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Construction industry, \*Cameroon, Construction materials, Cements, Gravel, Bamboo, Bricks, Wood, Buildings, Developing countries, Africa.  
Identifiers: Developing country application.

The United Republic of Cameroon is located between West and Central Africa. The country enjoys a tropical to subtropical climate. The country has four major regions distinguished on basis of climate and geology...factors that influence the type and distribution of building materials. The main local building materials are: cement, sand, gravel, stone, cement blocks, clay blocks, burnt bricks, hardwood, raffia bamboo, palm leaves, grass, corrugated aluminum sheets and iron rods. The main building types are constructed by a combination of these materials. Local building types are constructed by a combination of these materials. Local building materials is at a nascent stage as for example: research on concrete with palm nut shells as aggregate and research on lateritic concrete. Both research results are summarized in the paper. In view of the potential and low cost of local building materials serious research is called for at a national and regional level with an aim of understanding these materials and developing norms for their utility.

**PB-297 364/2** **MF A01**  
Intermediate Technology Development Group, London (England).  
**Co-Operative Organisation; an Introduction**  
B. A. Youngjohns. c1977, 37p Rept no. ISBN-0-903031-43-4  
Microfiche copies only.

Descriptors: Production, Farms, Industries, Government policies, Control, Organizations, Businesses, Great Britain.  
Identifiers: Developing country application, \*Co-operatives, Cooperative farming.

The booklet is about co-operatives, how they are formed, how they work, what the legal implications are, and what role they play in development. It sets out principles of a cooperative and explains in some detail the various forms it can take, from co-operative farms to industrial production. It also deals with the government's role and the various controls which it places on such organizations.

**PB-297 365/9** **MF A01**  
Norwegian Aid Agency, Oslo.



**Accounting and Book Keeping for the Small Building Contractor**  
Derek Miles. c1978, 196p  
Sponsored in part by Intermediate Technology Development Group, London (England).  
Microfiche copies only.

Descriptors: \*Accounting, \*Construction industry, \*Contractors, Developing countries, Records management, Assets, Liabilities, Fixed investment, Capitalized costs, Depreciation, Profits, Losses, Construction costs, Financial management.  
Identifiers: \*Small businesses, Developing country application.

The book is the first in a series of publications written to help small contractors in developing countries establish and run a business effectively. Topics covered in the volume include: keeping records; assets and liabilities; basic book-keeping; analysis; fixed assets; depreciation; balance sheets; profit and loss accounts; reading and comparison of accounts; and practical exercises.

**PB-297 366/7** MF A01  
Intermediate Technology Development Group, London (England).  
**Simple Methods of Candle Manufacturing**  
David Schreiber, and Dennis Rose. c1975, 23p  
Rept no. ISBN-0-903031-49-3  
Microfiche copies only.

Descriptors: \*Manufacturing, \*Candles, Pouring, Moulding techniques, Waxes, Melting, Great Britain, Materials, Equipment.  
Identifiers: Developing country application.

The booklet shows how, without expensive and sophisticated machinery, it is possible to manufacture candles. A description of how a candle works is given and the importance of the size of the wick is stressed. Information is provided on materials required, candle making techniques, and of the process. Line illustrations of the simple equipment that may be used are included.

**PB-297 367/5** MF A01  
Intermediate Technology Development Group, London (England).  
**Business Arithmetic for Co-Operatives and Other Small Business; a Basic Manual for the Employees of Primary Co-Operative Societies**  
Trevor Bottomley. c1977, 89p Rept no. ISBN-0-903031-47-7  
Microfiche copies only.

Descriptors: \*Arithmetic, Manuals, Great Britain.  
Identifiers: Developing country application, \*Cooperatives, Cooperative farming, \*Small businesses.

The manual is designed to enable those involved in co-operatives or small businesses to train themselves to do the calculations necessary for the running of a business. Part I of the manual is very elementary and intended only for those who feel they need to go back to the beginning. Part II covers all the calculations normally called for in a business.

**PB-297 368/3** MF A01  
Intermediate Technology Development Group, London (England).  
**Chinese Chain and Washer Pumps**  
Simon Watt, and John Collett. cJul 77, 67p Rept no. ISBN-0-903031-26-4  
Microfiche copies only.

Descriptors: \*Pumps, China, Well pumps, Water supply, Chains, Drawings, Pipes(Tubes), Great Britain.  
Identifiers: Developing country application.

The publication contains twenty-one versions of the chain and washer water lifting device, displayed at the 1958 Peking Agricultural Exhibition, China. Each version of the pump was designed and built by separate communes, using local materials, skills and tools. A description of each pump with performance figures is provided on simple information sheets. Drawings are included to give a basic understanding of the mechanics needed to build one of the devices.

**PB-297 369/1** MF A01  
Granfield Inst. of Tech. (England). Marketing Development Centre.  
**Small Enterprises in Developing Countries: Case Studies and Conclusions**  
Malcolm Harper, and Tan Thiam Soon. c1979, 111  
Sponsored in part by Intermediate Technology Development Group, London (England).  
Microfiche copies only.

Descriptors: \*Manufacturing, Soaps, Leather, Plastics, Fertilizers, Roofs, Tiles, Woolen spun yarns, Production management, Failure, Operations, Developing countries, Great Britain.  
Identifiers: Developing country application, \*Small businesses, \*Case studies.

The publication includes over 20 case studies of problems encountered by small businesses in various developing countries. There are individual commentaries on the studies and, in the second part of the book, a general discussion of the factors which determine the success or failure of a small business. A few of the case studies include soap manufacturing, a candy factory, leatherworks, plastics, fertilizer, roof tile manufacturing, a wool spinning center, and a block maker.

**PB-297 370/9** MF A01  
Intermediate Technology Development Group, London (England).  
**The Work of a Co-Operative Committee**  
Peter Yeo. c1978, 83p Rept no. ISBN-0-903031-53-1  
Microfiche copies only.

Descriptors: Organizations, Management, Planning, Great Britain.  
Identifiers: Developing country application, \*Cooperatives, Loans, Cooperative farming.

The book has been written as a guide for members and prospective committee members of primary cooperatives. It deals with the basic facts about the committee, how the committee serves the members and what loans can be made to the members of the cooperative. It sets out clearly what a committee member's duties are, as well as his responsibilities in law. The book has been designed as a programmed learning text with material for six meetings of study groups, including the private study needed before each meeting. The book should prove a useful introduction for anyone who is interested in becoming a member of the committee of a cooperative.

**PB-297 371/7** MF A01  
Intermediate Technology Development Group, London (England).  
**Methane Generation by Anaerobic Fermentation; an Annotated Bibliography**  
Christina Freeman, and Leo Pyle. c1977, 71p  
Rept no. ISBN-0-903031-41-8  
Microfiche copies only.

Descriptors: \*Methane, \*Anaerobic processes, \*Bibliographies, Reaction kinetics, Microbiology, Nutrients, Fertilizers, Construction materials, Fermentation, Fuels, Bacteria, Mathematical models.  
Identifiers: Manufactured gas, Synthetic fuels, Solid wastes, Developing country application.

This bibliography is for those who are directly involved or interested in building, designing, and improving methane generators in the developing countries. It includes the basic and relevant material required to enable those working in this field to decide on the viability of gas production and to help them learn from other people's experience.

**PB-297 372/5** MF A01  
Intermediate Technology Development Group, London (England).  
**A Manual of Building Construction**  
Harold K. Dancy. c1977, 379p Rept no. ISBN-0-903031-08-06  
Microfiche copies only.

Descriptors: \*Construction, \*Manuals, Masonry, Walls, Bricks, Layout, Excavation, Foundations, Windows, Roofs, Carpentry, Concretes, Plumbing, Utilities, Painting, Great Britain.

Identifiers: Developing country application.

The book is a practical field building manual. It is divided into five sections: preparation, masonry, carpentry, concrete, and finishing trades. Many illustrations are included for demonstrating principals in construction.

**PB-297 373/3** MF A01  
Intermediate Technology Development Group, London (England).  
**Hand Dug Wells and Their Construction**  
S. B. Watt, and W. E. Wood. c1977, 226p Rept no. ISBN-0-903031-27-2  
Microfiche copies only.

Descriptors: \*Water wells, \*Developing countries, Construction, Ground water, Water supply, Labor estimates, Materials, Equipment, Mixing, Concretes, Shaft sinking, Excavation, Disinfection, Safety, Linings, Great Britain.  
Identifiers: Developing country application, Villages, Self help.

The book presents a range of technology suitable for exploiting ground-water sources at low cost, with minimum sophisticated technology and with the greatest input of village labour and skills. The methods described combine traditional principles with modern techniques. Part I describes some general principles together with a reference to the health implications of a hygienic source of water and some notes on the organization and preparation of well sinking work. Part II describes in simple detail the actual construction of a particular size and type of well that has proved successful in many parts of the world under widely differing conditions. Part III deals with alternative materials and techniques which may be more suitable in certain circumstances. Part IV describes in greater detail the standard equipment and materials used. Part V comprises additional information that may be of some use to those interested in well sinking.

**PB-297 374/1** MF A01  
Intermediate Technology Development Group, London (England).  
**Economically Appropriate Technologies for Developing Countries; an Annotated Bibliography**  
Marilyn Carr. c1976, 104p Rept no. ISBN-0-903031-19-1  
Microfiche copies only.

Descriptors: \*Bibliographies, \*Developing countries, Agriculture, Construction materials, Houses, Manufacturing, Public utilities, Roads, Economic factors, Great Britain.  
Identifiers: Developing country application, \*Appropriate technology.

The bibliography provides information on the economic aspects of intermediate technologies for developing countries. This volume is basically concerned with hardware. The material has been divided into six sections. The first four sections cover technologies related to the basic human needs of food, shelter, manufactured goods such as clothing, footwear and various household items, and infrastructural goods such as power sources, water supplies, health services, roads and transportation. The last two sections contain a selection of technical publications and bibliographies which provide useful back-up material to the main studies.

**PB-297 375/8** MF A01  
Intermediate Technology Development Group, London (England).  
**Ferrocement Water Tanks and Their Construction**  
S. B. Watt. c1978, 121p Rept no. ISBN-0-903031-51-5  
Microfiche copies only.

Descriptors: \*Water tanks, \*Construction, Cements, Reinforcing materials, Wire, Foundations, Design, Construction materials, Water storage, Great Britain.  
Identifiers: Developing country application, \*Ferrocement.



This publication describes in detail, methods of constructing water storage tanks from wire-reinforced cement-mortar. These tanks are widely used in many parts of the world to collect and store water for domestic, stock, irrigation, and also for industrial purposes. Subject areas include planning and designing the tank, standard methods of construction, and alternative designs. (Copyright (c) Intermediate Technology Publications Ltd, 1978.)

**PB-297 376/6** MF A01  
Norwegian Aid Agency, Oslo.  
**Financial Planning for the Small Building Contractor**  
Derek Miles. c1979, 192p  
Sponsored in part by Intermediate Technology Development Group, London (England).  
Microfiche copies only.

Descriptors: \*Financial management, \*Construction industry, \*Contractors, Planning, Scheduling, Cash flow, Investments, Billing, Accounting, Cost engineering, Resource allocation, Capital, Financing, Project management, Labor estimates, Materials estimates, Budgeting, Developing countries.  
Identifiers: \*Small businesses, Developing country application.

This book is the second in a series of publications designed to provide ideas and techniques for good business management. Topics covered in this volume include: planning the year's work; job programs; cash flow; investment decisions; billing procedures and work study techniques. Saving time and money are also themes.

**PB-297 377/4** MF A01  
Intermediate Technology Development Group, London (England).  
**Small Scale Cement Plants**  
Jon Sigurdson. c1977, 31p Rept no. ISBN-0-903031-46-9  
Microfiche copies only.

Descriptors: \*Industrial plants, \*Manufacturing, \*Cements, India, China, Comparison, Portland cements, Great Britain, Bibliographies, Design, Kilns, Developing countries.  
Identifiers: Developing country application, Small businesses.

The booklet examines the criteria which would justify the establishment of mini cement plants in developing countries and specifically compares the situation in India with that in China, where more than 57% of cement is produced by small plants. The quality of the cement produced is also discussed and comparisons are drawn between cement from mini cement plants and that of portland cement. A short bibliography is provided as well as designs of vertical shaft kilns taken from a Chinese book on small scale cement plants.

**PB-297 378/2** MF A01  
Intermediate Technology Development Group, London (England).  
**Technology for a Changing World**  
Roger England, and John Davis. c1978, 66p  
Rept no. ISBN-0-903031-56-6  
Microfiche copies only.

Descriptors: \*Technology assessment, \*Economic development, Environments, Social change, Productivity, Manpower, Capital, Energy, Businesses, Education, Technological intelligence, Quality of life.  
Identifiers: Small business, Developing country application.

The booklet is concerned with the application of the concepts of appropriate technology to the economy. It is a recognition of the fact that rich and poor countries alike stand in need of a new kind of technology which is more in harmony with people and with the environment. Subject areas include the appropriateness of conventional technology; productivity; energy; small enterprises; local enterprise trusts; education for a new world; and the right to choose technologies.

**PB-297 379/0** MF A01  
Intermediate Technology Development Group, London (England).

## Equipment for Rural Workshops

John E. L. Boyd, S. A. Bonnist, J. R. Collett, A. Mallett, and H. S. Pearson. c1978, 96p Rept no. ISBN-0-903031-45-0  
Microfiche copies only.

Descriptors: \*Equipment, \*Woodworking, \*Metal working, Tools, Workplace layout, Cost estimates, Power equipment, Machine tools, Great Britain.  
Identifiers: Developing country application.

The book is a guide to anyone who wishes to equip a workshop from the basic tools required for a one or two man carpentry workshop without power to the more sophisticated establishment requiring power equipment for both wood and metal working. Only well-known and reliable equipment is listed. The tools specified are all illustrated and workshop layouts are suggested. There are photographs of various sizes of workshops in different countries, as well as some pictures of farming equipment that has been manufactured at some of the workshops. Suppliers' addresses are also given in an appendix. Prices quoted in the books may soon be out of date, but they give an inexperienced person some idea of the budget required for a particular size of workshop.

**PB-297 380/8** MF A01  
Intermediate Technology Development Group, London (England).  
**A Manual on the Hydraulic Ram for Pumping Water**  
S. B. Watt. c1975, 53p Rept no. ISBN-0-903031-15-9  
Prepared in cooperation with National Coll. of Agricultural Engineering, Silsoe (England).  
Microfiche copies only.

Descriptors: \*Hydraulic equipment, \*Rams(Pumps), \*Construction, Construction materials, Fluid flow, Design, Valves, Assembling, Pipe fittings, Water supply.  
Identifiers: Developing country application, Hydraulic rams.

This manual describes the process for building and installing the hydraulic ram. Part 1 explains how a simple ram pump can be made from commercial pipe fittings, how to choose a site for the ram, how to install and adjust the ram, and the sort of maintenance that the ram pump will need during its working life. Part II describes in greater detail the range and limits of the operation of ram pumps, and the different materials that have been used to make them. The manual is in non-technical language so that it can be used by people with little or no technical training.

**PB-297 558/9** MF A01  
Intermediate Technology Development Group, London (England).  
**Water Treatment and Sanitation; a Handbook of Simple Methods for Rural Areas in Developing Countries**  
H. T. Mann, and D. Williamson. Jan 76, 94p Rept no. ISBN-0-903031-23-X  
Revision of report dated Jun 73.  
Microfiche copies only.

Descriptors: \*Water treatment, \*Sewage treatment, \*Solid waste disposal, \*Manuals, Transport properties, Substitutes, Rural areas, Water supply, Sludge disposal, Water resources, Water analysis, Potable water, Equipment, Design.  
Identifiers: Developing country application.

The purpose of this handbook is to provide information which must be considered when investigating the development of a water supply and sewage disposal system for a small community which is situated too far from a piped system of water supply. Many of the methods of water and sewage treatment described in this handbook are based on the standard practices used in developing countries but which can be adapted. Chapters 1-6 describe methods which may be applied in sequence, from the selection of a water source, the transport of water, the treatment of water, the disposal of wastes, sewage treatment and the final disposal of treated wastes, and the by-products of treatment processes. In each chapter, a number of alternatives is described, some suitable for self-help situations and others which may be more suitable for

larger communities. A glossary is included to explain technical terms used in the text.

**PB-297 559/7** MF A01  
Intermediate Technology Development Group, London (England).  
**Food from Windmills**  
Peter L. Fraenkel. Nov 75, 83p  
Report on the Wind Mill Irrigation Project Initiated by the American Presbyterian Mission at Omo Station in Ethiopia.  
Microfiche copies only.

Descriptors: \*Windmills, \*Farm crops, \*Ethiopia, \*Irrigation, Omo River, Cultivation, Statistical analysis, Objectives, Design, History, Pumping, Water supply, Field tests, Construction.  
Identifiers: Developing country application.

This report describes work done to improve and evaluate a series of wind-mills developed for irrigating small plots of land on the banks of the Omo River in Ethiopia, using river water. The systems were developed by the American Mission for use by the local people in order to permit all year round cultivation which is not otherwise possible. Statistical information is included in the five appendices.

**PB-297 632/2** PC A03/MF A01  
Agency for International Development, Washington, DC.  
**Introduccion al D.C. Para Los Trabajadores de las Aldeas (An Introduction to Community Development for the Village Workers)**  
Community Development series A, no. 1  
Donald L. Beran. Apr 62, 38p

Descriptors: \*Community development, \*Developing countries, Quality of life, Planning, Meetings, Recommendations, Guidelines.  
Identifiers: Developing country application, \*Villages.

The term community development is used to describe the approach many governments have employed to teach their village people and to make more effective use of local initiative and energy for increased production and better living standards. This booklet specifically was planned to give insights into aims, basic principles and elementary procedures in community development on which workshop procedures would be based. It offers a common-sense approach to local village development procedures.

**PB-297 662/9** PC A03/MF A01  
United Nations Industrial Development Organization, Vienna (Austria).  
**International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Institutional Development of Appropriate Industrial Technology in Developing Countries: R and D Policies and Programmes**  
Background paper  
W. A. Fischer. 13 Oct 78, 41p  
Report of Working Group on Conceptual and Policy Framework for Appropriate Industrial Technology. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Technology innovation, \*Technology assessment, \*Developing countries, Research, Industries, Technological intelligence, Technology transfer, Research management, Government policies.  
Identifiers: \*Industrial technology, Institutional role, Research and development, Developing country application.

The focus of the paper is to discuss appropriate roles for industrial research and development in the developing world, within the broader context of an institutional infrastructure, as a means of facilitating the processes of technology acquisition and innovation. References are included.

**PB-297 663/7** PC A02/MF A01  
United Nations Industrial Development Organization, Vienna (Austria).



## International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Rural Transportation Facilities in Developing Countries

Discussion paper.  
16 Oct 78, 16p  
Report of Working Group No. 12, Appropriate Technology for Rural Transport. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Developing countries, Rural areas, Facilities, Cargo transportation, Passenger transportation, Design.  
Identifiers: \*Rural transportation, Developing country application.

The document addresses the need for the design and manufacture of alternative and appropriate modes of transport, both non-motorized and motorized, specifically to meet rural requirements. The technological alternatives considered are human portage; handcarts, wheel barrows etc.; muscle-powered and pedal-driven vehicles; animal-powered transport; motorized rural transport; and boats and outboard engines. A program of action is offered for the development of alternatives.

## PB-297 664/5 PC A03/MF A01 International Bank for Reconstruction and Development, Washington, DC.

**Designing Rural Development Programs: Lessons from Past Experience in Africa**  
Uma Lele. 1974, 41  
Prepared in cooperation with Reading Univ., (England), and Overseas Development Inst., Reading (England). Sponsored in part by Agency for International Development, Washington, DC. Presented at the Second International Seminar on Change in Agriculture.

Descriptors: \*Economic development, \*Projects, \*Rural areas, \*Saharan Africa, \*Kenya, \*Tanzania, Africa, Low income groups, Regional planning, Personnel development, Manpower utilization, Land use, Technology assessment, Resource allocation, Credit, Prices, Marketing.  
Identifiers: \*Rural development, Governmental role, Developing country application, Rural population.

The study examines ways of designing rural development projects which will effectively reach large numbers of low-income rural people with the limited financial resources, and in particular, the scarce trained manpower available for rural development in Africa. The study involved two components. The first consisted of a review of past projects in sub-Saharan Africa. The second involved rural sector surveys in Kenya and Tanzania. The major findings are based on thirteen sets of rural development projects and programs selected from various parts of sub-Saharan Africa to represent diversity in design and implementation as well as in the environment in which they are situated.

## PB-297 665/2 PC A05/MF A01 United Nations Industrial Development Organization, Vienna (Austria).

**International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Choice and Adaptation of Appropriate Technology in Production of Drugs and Pharmaceuticals in Developing Countries**

Background paper  
B. Shah. 13 Oct 78, 93p  
Report of Working Group No. 2, Appropriate Technology for the Manufacture of Drugs and Pharmaceuticals. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Drugs, Manufacturing, Technology, Equipment, Design criteria, Cost analysis, Tables(Data).  
Identifiers: Developing country application.

This document examines the needs of developing countries in producing drugs of adequate quality in sufficient quantities and at prices within the reach of the common people. The developing countries are divided into five groups for purposes of deter-

mining their method of manufacturing based on their stage of development. Appendices are provided giving further data on drug and pharmaceutical production.

## PB-297 666/0 PC A04/MF A01 American Univ., Washington, DC. American Language Center.

**A Glossary of Agricultural Terms. English-French, French-English**  
1961, 56p  
Prepared in cooperation with Pan American Union, Washington, DC. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Dictionaries, \*Agriculture, English language, French language.  
Identifiers: Developing country application.

This glossary, based on an English-Spanish word-list produced by the American University Language Center was prepared with the assistance of Mr. Paul Cretien of the Pan American Union, Washington, DC.

## PB-297 667/8 PC A02/MF A01 Chamber of Commerce of the Philippines, Manila.

**The Small Biogas Plant: Its Construction, Operation and Use**  
Felix D. Maramba, Sr, Enrico D. Obias, and Calixto C. Taganas. May 77, 23p  
Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Methane, \*Farms, \*Agricultural wastes, Design, Equipment, Agricultural engineering, Cost analysis, Fertilizers, Sludge disposal, Organic compounds, Digesters, Manufactured gas, Slurries.  
Identifiers: \*Biogas process, Manure, Synthetic fuels, Solid wastes, Developing country application.

This booklet has been prepared in response to the demand for reference material to help interested parties design and operate small biogas plants. It is written in relatively simple language, understandable to people with limited scientific and technical training and it gives the practical approach. Because of the pressing demand for food, more fertilizer is needed to raise more crops, but supply is getting less. With a biogas plant, a one-hectare farm with one work carabao and a two-sow units or three-porker units can produce enough fuel to cook the meals of a family of seven, light his home, iron his clothes, and produce enough fertilizer to continuously crop the farm all year round. The biogas plant is the most practical and least expensive solution to the problem relating to pollution and lack of fuel and food, particularly for rural areas. For the farmer it will be a key towards self-reliance and self-sufficiency.

## PB-297 669/4 PC A04/MF A01 Agency for International Development, Washington, DC.

**Research and Information Required to Support the Effort to Reach the Rural Poor**  
James W. Green. Jan 75, 60p

Descriptors: \*Rural areas, \*Disadvantaged groups, Developing countries, Quality of life, Surveys, Project planning, Low income groups.  
Identifiers: Developing country application.

The emphasis in this study is to define the poor in operational terms and to construct quality of life indicators which can be used to match the direction and extent of change brought about by any programs especially oriented to greater equity for the rural poor. The study is divided into three areas of discussion: AID policies and procedures; methods of research; and subjects of research.

## PB-297 680/1 PC A08/MF A01 Intermediate Technology Development Group, London (England).

**Lime and Alternative Cements: Proceedings of a One-Day Meeting on Small-Scale Manufacture of Cementitious Materials**  
Robin Spence. 1974, 174p Rept no. ISBN-0-903031-13-2

Sponsored in part by Transport and Road Research Lab., Crowthorne (England), and the Wates Foundation, London (England).

Descriptors: \*Construction materials, \*Cements, Pozzolans, Lime cements, Masonry cements, Mineralogy, Kilns, Manufacturing, Production, Raw materials, Developing countries.  
Identifiers: Developing country application, \*Portlandite.

The report contains papers describing alternative cements used for construction materials. The alternative materials are proposed to maximize the use of local skills and resources and to minimize the importation of skills or goods. The papers discuss the cements, the manufacturing processes involved in their production, and the applications for using the end products.

## PB-297 740/3 PC A06/MF A01 Shrimp Culture Research Centre, Djepara (Indonesia).

**Bulletin of the Shrimp Culture Research Centre. Volume 2, Number 1 and 2, January/July 1976**  
Alie Poernomo, and Sukotjo Adisukresno. Jul 78, 112p  
Also pub. as ISSN-0126-1924. Sponsored in part by Agency for International Development, Washington, DC. Errata sheet inserted.

Descriptors: \*Shrimps, \*Brackish water, \*Aquaculture, Coasts, Indonesia, Developing countries.  
Identifiers: Developing country application, Chanos chanos.

This Bulletin is primarily meant for publication of results of research carried out at the Research Centre. Also considered were contributions from workers outside the Centre on brackish water and coastal aquaculture in Indonesia.

## PB-297 784/1 MF A01 Intermediate Technology Development Group, London (England).

**Farm Equipment Development Project, Daudawa, N.C.S., Nigeria**  
Rept. for Nov 71-Dec 73  
J. E. L. Boyd, and E. A. Ayok. c1974, 118p Rept no. ISBN-0-903031-48-5  
Microfiche copies only.

Descriptors: \*Agricultural machinery, \*Weed control, \*Nigeria, Herbicides, Farm crops, Harvesting, Equipment, Drawings, Manufacturing, Design, Specialized training, Guidelines, Great Britain, Developing countries.  
Identifiers: Developing country application.

A survey identified weeding as a labor bottleneck limiting crop production on farms employing animal drought for land preparation. Improvement in the methods of weed control was made the primary objective of the project. The ox-drawn EMCOT ridger plough had been in use for some time in the area, and the report covers the design, development, production and use of several other machines and of attachments for the EMCOT. All items were designed for local construction from easily available materials, using simple equipment. Manufacturing instructions are included for interpretation by the non-engineer. The report is accompanied by a chart summarizing the rainfall, cropping calendar and labor inputs throughout the growing season, and information on land use, tenure, labor, capital and income of a typical traditional family.

## PB-297 785/8 MF A01 Intermediate Technology Development Group, London (England).

**Rural Africa Development Project: A Survey Technique for Identifying the Needs of Small Farmers, and an Example of Its Use in Zambia**  
R. D. Mann. cApr 74, 76p Rept no. ISBN-0-903031-33-7  
Microfiche copies only.

Descriptors: \*Farm management, \*Zambia, Surveys, Rural areas, Africa, Problem solving, Manpower, Developing countries, Great Britain.  
Identifiers: Developing country application.



# APPROPRIATE TECHNOLOGY ABSTRACTS

The paper is written in two sections. Part I explains the need to make a survey and identify farmer's real problems before trying to introduce new techniques. Part II is a case study of the organization of a labor use survey carried out among small farmers in Zambia. The field administration of the survey is described.

**PB-297 787/4** MF A01  
Intermediate Technology Development Group, London (England).  
**Tools for Agriculture: A Buyer's Guide to Low-Cost Agricultural Implements**  
John Boyd. c1976, 162p Rept no. ISBN-0-903031-22-1  
Microfiche copies only.

Descriptors: \*Agricultural machinery, \*Directories, \*Manufacturers, Tools, Power equipment, Developing countries, Pumps, Sprayers, Plows, Great Britain.  
Identifiers: Developing country application.

The guide describes commercially manufactured small farm implements which are available for use in developing countries and gives the names and addresses of the manufacturers. It contains information on hand operated, animal drawn and small engine powered equipment.

**PB-297 788/2** MF A01  
Intermediate Technology Development Group, London (England).  
**Towards Village Industry: A Strategy for Development**  
Liv Berg, Krisno Nimpuno, and Roger van Zwabenberg. c1978, 87p Rept no. ISBN-0-903031-52-3  
Microfiche copies only.

Descriptors: \*Planning, \*Industries, Community development, Developing countries, Agricultural machinery, Development, Africa, Guidelines, Great Britain.  
Identifiers: \*Villages, Developing country application.

The book deals with village industry and cottage industries in the very poorest countries, in the context of community development. The basic premise of the book is that industrialization of the rural areas in developing countries must play a vital role and that the mechanization of agricultural methods and production will have to develop in conjunction with this. Illustrations are included. Chapter topics include: rural industries; pre-capitalist industry in East Africa; petty production; the contemporary situation; village work shop design; and strategy towards village workshops.

**PB-297 789/0** MF A01  
Intermediate Technology Development Group, London (England).  
**A Manual on Building Maintenance. Volume 1: Management**  
Derek Miles. 1976, 80p Rept no. ISBN-0-903031-28-0  
Microfiche copies only.

Descriptors: \*Buildings, \*Maintenance, \*Developing countries, Budgeting, Financial management, Cleaning, Renovating, Guidelines, Manpower, Materials, Equipment, Great Britain.  
Identifiers: Developing country application.

The manual sets out the guidelines for a system of budgeting and financial control of maintenance procedures in developing countries. Maintenance work is very diverse and difficult to group into clear categories for budgeting purposes. This manual will help establish efficient control procedures, including a resource budget which covers finance, manpower, materials and equipment, together with a rational and practical system for measuring output and performance.

**PB-297 790/8** MF A01  
Intermediate Technology Development Group, London (England).  
**A Manual on Building Maintenance. Volume 2: Methods**  
Derek Miles. c1976, 68p Rept no. ISBN-0-903031-40-X

Microfiche copies only.

Descriptors: \*Buildings, \*Maintenance, \*Developing countries, Cleaning, Services, Maintenance, Walls, Foundations, Plastering, Painting, Roofs, Roofing, Guidelines, Methodology, Great Britain.  
Identifiers: Developing country application.

The volume deals with the basic technology of building maintenance. The function of maintenance includes three parts: cleaning and servicing, rectification and repair, and replacement. The book will assist in the examination of maintenance problems, suggesting some of the more common causes of failure and methods for dealing with these problems. The contents include: foundation, walls, plastering and rendering, paints and thin coatings, and roofing.

**PB-297 791/6** MF A01  
Appropriate Health Resources and Technologies Action Group, London (England).  
**Auxiliaries in Primary Health Care; an Annotated Bibliography**  
Katherine Elliott. c1979, 135p Rept no. ISBN-0-903031-58-2  
Sponsored in part by Intermediate Technology Development Group, London (England).  
Microfiche copies only.

Descriptors: \*Bibliographies, Indexes(Documentation), Communities, Abstracts, Foreign countries.  
Identifiers: \*Primary health care, Developing country application, Allied health personnel, Health manpower education, Subject indexes, Community health services.

The bibliography is a reference for those concerned with the training and supervision of health auxiliaries. It is intended to promote a greater exchange of know-how, of useful teaching materials and background information, and to encourage experimentation. Section I deals with education and training of auxiliaries in primary health care. Section II provides auxiliaries and community health and development. Appendices include a geographical index, a subject index, addresses, journals referred to in the bibliography, and publishers referred to in the bibliography.

**PB-297 792/4** MF A01  
Intermediate Technology Development Group, London (England).  
**An Initial Course in Tropical Agriculture for the Staff of Co-Operatives**  
Peter Yeo. c1976, 58p Rept no. ISBN-0-903031-39-6  
Microfiche copies only.

Descriptors: \*Agriculture, \*Tropical regions, Soil conservation, Fertilizing, Pest control, Animal husbandry, Developing countries, Guidelines, Instructional materials, Great Britain.  
Identifiers: Developing country application, \*Co-operatives.

The course in this book is meant for those concerned with rural development programs in a tropical country. The course is divided into five sections: soil and the natural environment, fertilizers and plant nourishment, controlling pests and diseases, and animal husbandry I & II. At the end of each section there is a progress test with answers supplied. The book provides a sound basis of agricultural knowledge which can then be followed by practical observation.

**PB-297 854/2** PC A05/MF A01  
Centro de Estudios Mesoamericano sobre Tecnologia Apropriada (Guatemala).  
**Tecnologia Apropriada: Concepto, Aplicacion, y Estrategias (Appropriate Technology: Concepts, Application, and Strategy)**  
Bertha Salinas Amescua. Dec 78, 88p

Descriptors: Developing countries, Technical assistance, Technology, Development, Improvement, Planning, Rural areas.  
Identifiers: \*Appropriate technology, Developing country application, Villages.

An analytical description of 'appropriate technology' and its theoretical and conceptual grounds are presented. The minimal criteria used to define a technology as appropriate, the types of socio-economic groups which develop it, and the advantages ascribed to such technology are analyzed. A discussion of the problems posed by the interdependence of the industrialized world and the third world, and the appropriate technology's image as the solution to these problems are presented. The different vested interests and the political positions of those who propose such a technology or what these groups interpret as 'appropriate technology' are detailed. Specific examples, methodology used in 'disaster areas', and proposed strategies to develop the appropriate technology concept in a beneficial manner are reported.

**PB-297 856/7** PC A05/MF A01  
Ministerio de Agricultura, Lima (Peru).  
**Quesos Andinos del Peru (Cheeses from the Andine Region in Peru)**  
Jose Dubach, Javier F. Pulgar, and Vidal Biber. 24 Mar 73, 90p

Descriptors: \*Food processing, \*Cheeses, \*Peru, Production methods, Milk, Fermentation, Pasteurizing, Food contamination, Developing countries, Butter, Dairy products, Equipment, Industrial plants, Cost estimates.  
Identifiers: Developing country application.

Fundamental principles for the production of high-quality, hygienic cheeses are presented. Different physical-chemical tests for both the milk to be used and the ferment to be added are described (e.g.: acidity of the milk, density, fat determination, etc.). The principles of pasteurization and production of cheese using bacterial and enzymatic processes are explained. A detailed chart of the different ferments and their characteristics is included, as well as methods to produce yogurt, butter, and melted cheese. Diagrams for the installation of a dairy and equipment needed for a basic dairy capable of processing 400 liters of milk per day are included. Detailed cost estimates and equipment needs for a semi-industrial dairy (capacity 1200 liters), are given. A list of equipment suppliers in Peru is included. In addition, a step by step description of Tilsit type cheese and Andino type cheese are presented. Problems encountered in the ripening and fermentation of the cheese, such as those produced by bacterial contamination are explained and preventive measure described. Recipes for the production of five different types of cheeses are given. Efficiency and cost estimates per type of cheese are calculated.

**PB-297 857/5** PC A04/MF A01  
Ministerio de Agricultura, Lima (Peru).  
**Quesos para Regiones Tropicales (Cheeses for Tropical Regions)**  
Javier Pulgar-Vidal Biber. Jan 74, 53p

Descriptors: \*Food processing, \*Cheeses, \*Peru, Jungles, Production methods, Equipment, Cost estimates, Preserving, Tropical regions, Developing countries.  
Identifiers: Developing country application.

The method of production of fresh white cheese and ripened cheese in the Peruvian Jungle are presented. The prime material and equipment needed for each kind of cheese are described. The details and production costs are analyzed. Only milk of three percent fat has been used. Temperature conditions for the preparation of the fresh white cheese (Ucayalino), as well as methods for precipitating the protein of the milk are given. The milk used has to be preserved with hydrogen peroxide. Under tropical conditions, this cheese can be preserved for four to five days, although the preservation period can be prolonged to up to fifteen to twenty days if refrigeration is available. The ripened cheese or Provolone Amazonico has different processing conditions. Acidified milk can be used and hydrogen peroxide preservation is not needed. The preservation period for this cheese under tropical conditions is up to two months. Simpler equipment is required for this type of cheese than for the fresh white cheese. No mold, cheese cloth or presses are needed nor is it necessary to wrap the cheese. An estimate of milk needed per



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kg of cheese produced is given for both types of cheese.

**PB-297 858/3** PC A02/MF A01  
New Mexico State Univ., Las Cruces.  
**A Wind Energy Review: Low-Cost Machines for Agricultural and Rural Applications**  
Raymond A. Willem. 1978, 11p  
Presented at the Conference on Energy and Agriculture in the Caribbean, Santa Domingo, November 29-December 1, 1978. Sponsored in part by Agency for International Development, Washington, DC.

Descriptors: \*Agricultural engineering, \*Well pumps, \*Irrigation, Pumping, Artificial lift(Wells), Windmills, Reviewing.  
Identifiers: \*Wind power, Developing country application.

Small-scale irrigation appears to be the most effective use of wind energy in the Third World. This coincides with the fact that improving the agricultural output and living standards of the small scale farmer is one of the most pressing developmental goals in these areas. Several wind-powered water-pumping systems of an intermediate-technology level are reviewed and sources of further information are indicated.

**PB-297 859/1** PC A02/MF A01  
Instituto de Investigaciones Tecnológicas, Santiago (Chile).  
**Programa de Tecnología Rural Intermedia (Intermediate Rural Technology Program Information Bulletin)**  
Jul 78, 15p

Descriptors: \*Food processing, \*Potable water, \*Developing countries, Fruits, Methane, Fuels, Dehydration, Drying, Rural areas, Filtration, Chile.  
Identifiers: Developing country application, Announcement bulletins.

Description of four different 'intermediate' technology projects developed by INTEC are presented: (1) Grape drying using a solar system of natural heat transfer. (2) A bio-fuel generator, using animal excrement and vegetable refuse as sources of methane. (3) Home-made solar dehydrator for agricultural products. (4) Construction of a sand filter for water purification in rural zones. Each succinctly described project is accompanied by a construction diagram. This publication also lists a large number of available intermediate technology project descriptions, which can be obtained by writing to INTEC. The addresses of international organizations that have a compiled bibliography of this type of simple technology are included.

**PB-297 865/8** PC A09/MF A01  
IDI Research, Inc., Cincinnati, OH.  
**Estudio Sobre Fertilizantes (Study on Fertilizers)**  
1961, 196p

Descriptors: \*Fertilizers, Developing countries, Latin America, Materials, Prices, Supply(Economics), Demand(Economics), Nitrogen, Soil analysis, Soil chemistry, Argentina, Chile, Uruguay, Paraguay, Bolivia, Production methods, Production planning, Marketing, Manufacturing, Industries, Cost estimates.  
Identifiers: Developing country application.

An evaluation of the existing fertilizer materials in the world, and of the exports of the main producing countries are presented. A discussion of the situation of fertilizers in Latin America, prices, supply and demand, role of nitrogen in the fertilizer industry, and of the types of fertilizers in agriculture are offered. A chemical analysis of the soil types in the area of interest (Argentina, Chile, Uruguay, Paraguay, and Bolivia) and recommendations of the appropriate fertilizer needed for each area as well as an evaluation of the agricultural potentials of these areas are included. An analysis of the potential market for fertilizers, the prime location for a fertilizer factory, types of production processes to be employed, and the distribution nets to be established, as well as an estimate of capital to be invested, and total production costs and gains are presented.

**PB-297 867/4** PC A03/MF A01  
Instituto de Investigaciones Tecnológicas, Bogota (Colombia).  
**Elaboracion de la Panela (Production of 'Panela' or Brown Sugar Cakes)**  
1964, 48p

Descriptors: \*Food processing, Nutrients, Production methods, Sugarcane, Developing countries, Colombia.  
Identifiers: Developing country application, \*Brown sugar.

Methods used in the production of 'Panela' (brown sugar cakes) are presented. A comparison between the nutrients in panela and in refined sugar is included. Quality requirements for different grades of brown sugar in terms of color, turbidity, saccharose and protein content are given. Yield estimates per 1000 kg of sugarcane juice are included. The processes of cane cutting, juice extracting, clarifying (through the addition of mono-calcium phosphate, adjusting of pH, and removal of impurities and agglutinates) and the final molding into panela cakes and packaging are depicted. Different types of sugarmill designs, appendices itemizing the terms used in this industry and yield data for different extraction methods are included. A comparison is made between real and artificial panela (consisting of sugar and aniline), in terms of physical and chemical properties.

**PB-297 868/2** PC A02/MF A01  
Direccion General Forestal, San Jose (Costa Rica).  
**Reforestacion (Reforestation)**  
Dick Lemckert, and Luis Gmo. Rodriguez. Feb 78, 19p

Descriptors: \*Reforestation, \*Developing countries, Erosion control, Droughts, Spanish language, Cost estimates, Planting, Cutting, Plants(Botany), Forest trees, Operations, Foreign countries.  
Identifiers: Developing country application, Small farms.

Reforestation as a method to control erosion and droughts is presented. Planting techniques and soil preparation methods are described step by step. A list of foreign and local tree species suitable for reforestation purposes in this geographical area (Pacific zone, 0-800 m. above sea level), and a diagram describing each step of the operation are included. Appropriate planting and pruning periods are indicated. Cost estimates for the planting operation are provided, personnel and materials needed per hectare for the different steps in the operation are described, and expected returns for the grown trees are calculated. A 12% gain over invested capital is expected. The report is suited to the available resources in underdeveloped countries. It is described in a clear, concise manner, and is suitable for use by small farmers or as a community project.

**PB-297 869/0** PC A05/MF A01  
Ministerio de Recursos Naturales, Tegucigalpa (Honduras).  
**Tecnología para Campesinos Hondureños Informe de un Seminario (Small Farmer Technology for Honduras-Seminar Report)**  
May 78, 82p

Descriptors: \*Developing countries, \*Farms, \*Honduras, Education, Technology, Government policies, Upgrading, Project planning.  
Identifiers: Developing country application, Small farms.

A discussion of appropriate technology programs applied to Honduras, the objectives of such programs, the needs of the small farmer, and his degree of participation in such programs, the role of education and training, the general program structure, and the role of the government are presented. The results of the discussions at this small farmer technology seminar and the conclusions arrived at in terms of problems to be solved by intermediate technology and ways of updating the skills of the target group are included.

**PB-297 870/8** PC A02/MF A01  
Instituto de Investigaciones Tecnológicas, Santiago (Chile).  
**Secado Solar de Uvas, Programa de Tecnología Rural Intermedia (Solar Drying of Grapes, Intermediate Rural Technology Program)**  
Jul 78, 12p

Descriptors: \*Solar radiation, \*Drying, \*Grapes, \*Developing countries, Alkalinity, Chemical properties, Sodium hydroxide, Evaporation, Color, Structures, Construction, Food processing, Marketing, Chile, Seeds, Objectives, Spanish language, Diagrams, Rural areas.  
Identifiers: Developing country application, Raisins.

A new method to accelerate the drying of purple and yellow grapes using a short preliminary chemical treatment is described. By breaking up the skin through a very short immersion in alkaline solution, the evaporation of water is speeded up and the drying time is cut from 90 days to 20 days. To preserve the light color in yellow grapes, an additional sulfur treatment is needed to inhibit enzymatic reactions in the grape skin responsible for the dark pigmentation. A diagram describing the construction of an appropriate structure for the drying process is given. Information on the international market for the raisins and prices per ton paid during the years 1971-1976 are provided. A simplified step by step diagram of the whole process, listing objectives of each step, is supplied.

**PB-298 036/5** PC A04/MF A01  
Agency for International Development, Washington, DC.  
**Country Development Strategy Statement, FY 1981. Nepal**  
Jan 79, 66p

Descriptors: \*Economic development, \*Nepal, \*Foreign aid, Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning.  
Identifiers: Developing country application, Agency for International Development.

The document outlines the economic situation in Nepal and presents the AID program strategy for this country. It is prepared annually and used for planning purposes in the field and in Washington.

**PB-298 058/9** PC A03/MF A01  
Ministerio de Agricultura y Ganadería, Soyapango (El Salvador). Servicio de Recursos Pesqueros.  
**Evaluación Pesquera en el Lago de Ilopango y la Laguna de Olomega, 1977. Volume V, No. 5 (Fishing Evaluation of Lake Ilopango and the Olomega Lagoon, 1977. Volume V, No. 5)**  
Ricardo Alfredo Castro Aragon, and Jose Francisco Godinez. Oct 78, 42p

Descriptors: \*Fishing grounds, \*Plankton, \*Lake Ilopango, \*Olomega Lagoon, \*Water pollution, Feasibility, Eggs, Soils, Aquatic plants, Oxygen, Dissolved gases, Spanish language, Marketing, Sedimentation, Insecticides, El Salvador.  
Identifiers: Developing country application, Water levels, Eutrophication.

A feasibility report for fish culture in Lake Ilopango and the Olomega Lagoon was undertaken from May 24 to July 23, 1977. In Lake Ilopango, fishing was performed in the miry (muddy) soil area and in the organic matter area as well as in the sandy soil and rocky area. In the Olomega Lagoon, fishing took place in the miry soil and organic matter (dead plants, etc.) area. The fish caught were measured, weighed, and counted. Fish obtained from the Olomega Lagoon were dissected to determine their egg content and choose the best size fish to be kept. Nets with different mesh values were used and evaluated for their efficiency. Different species existing in each lake are listed. The authors list several problems encountered in the Olomega Lagoon. Problems in marketing due to commercial monopoly of fish caught and of fishing equipment are cited, as well as high insecticide level in the waters, low water level in the lagoon area, large amounts of Eichornia (aquatic plant), the latter two being responsible for low O<sub>2</sub> concentration and consequent death of the fish population.



# APPROPRIATE TECHNOLOGY ABSTRACTS

**PB-298 059/7** PC A02/MF A01  
Ministerio de Agricultura y Ganadería, Soyapango (El Salvador). Servicio de Recursos Pesqueros.  
**Estudio Limnológico Preliminar de la Laguna de Aramuaca. Vol. II, No. 1 (Preliminary Limnologic Study of Lake Aramuaca. Vol. II, No. 1)**  
Jose Francisco Godínez, and M. S. Andre DeGeorges. Jan 75, 24p

Descriptors: \*Fishing grounds, \*Biomass, \*Plankton, \*Lake Aramuaca, \*Water pollution, Concentration(Composition), Hydrogen sulfide, Carbon dioxide, Oxygen, Dissolved gases, Spanish language, Turbidity, Limnology, Temperature, El Salvador.  
Identifiers: Developing country application.

The chemical, physical, and biological studies of Lake Aramuaca were carried out in September 1974 (rainy season). It was observed that the lake of volcanic origin, has a reduced production of plankton and a chemical and thermal stratification occurring mainly at the lake's surface. It was concluded that the existing chemical and physical parameters encountered during the rainy season are unfavorable for the use of this lake as a fishing ground. High turbidity of the water, high alkalinity, and water hardness as well as unfavorable levels of CO<sub>2</sub>, H<sub>2</sub>S, O<sub>2</sub>, and SO<sub>4</sub>(-) make this lake's waters harmful to the organisms that could live there.

**PB-298 060/5** PC A06/MF A01  
Ministerio de Agricultura y Ganadería, Soyapango (El Salvador). Servicio de Recursos Pesqueros.  
**Contribución al Conocimiento Limnológico Comparativo del Lago de Guija en la Época Lluviosa de 1973 y Época Seca de 1974. Volumen II, No. 9 (Contribution to the Comparative Limnologic Knowledge on the Guija Lake in the 1973 Rainy Season and the 1974 Dry Season. Volume II, No. 9)**  
Technical rept.  
Franklin Americo Lopez, Jose Francisco Godínez, and M. S. Paul Andre DeGeorges. Sep 75, 106p

Descriptors: \*Fishing grounds, \*Plankton, \*Guija Lake, \*Water pollution, Limnology, Concentration(Composition), Aquatic plants, Benthos, Graphs(Charts), Tables(Data), Spanish language, El Salvador.  
Identifiers: Developing country application, Eutrophication.

A limnologic study of the Guija Lake at the end of the dry season (April 1974) was undertaken. One of the main objectives is to collect data to be compared to earlier data. During the previous rainy season (May-Sept 1973), physical, chemical, and biological parameters were determined for this lake in the dry season. Phytoplankton, zooplankton, and benthos (organisms like mollusks, etc.) at different depths were examined. The authors find noteworthy differences in the dry vs. rainy season parameters. During the dry months, partial stagnation of the lake is noticeable. In the period from November to February, the colder air and the wind lead to a mixture of the top layer of the water, which used to be warm, with the lower layer resulting in an inversion of water layers. This causes a remarkable (50%) lowering of the planktonic population due to a parallel lowering of available chemical nutrients. The authors recommend the rainy season as the best for seeding of the Tilapia Aurea. Graphs and tables comparing all of the studied parameters are included.

**PB-298 061/3** PC A03/MF A01  
Ministerio de Agricultura y Ganadería, Soyapango (El Salvador). Servicio de Recursos Pesqueros.  
**Estudios Limnológicos Preliminares de la Laguna Verde. Volumen II, No. 4 (Preliminary Limnologic Studies of Laguna Verde. Volume II, No. 4)**  
Jose Francisco Godínez, and M. A. Andre DeGeorges. Aug 75, 34p

Descriptors: \*Fishing grounds, \*Biomass, \*Plankton, \*Laguna Verde, \*Water pollution, Concentration(Composition), Hydrogen sulfide, Carbon dioxide, Oxygen, Dissolved gases, Turbidity, Limnology, Temperature, El Salvador.

Identifiers: Developing country application, Thermal pollution.

The report describes an evaluation of the available biomass in Laguna Verde as well as physical chemical characteristics of this lake and determination of its feasibility for exploitation for fishing purposes were carried out in October 1974. Physical parameters i.e. visibility, conductivity of the water, turbidity, and temperature were studied. Chemical parameters i.e. H<sub>2</sub>S, CO<sub>2</sub>, and O<sub>2</sub> concentration, pH, alkalinity, and water hardness were measured at three different stations in Laguna Verde. Biological studies of the zooplankton and phytoplankton encountered were carried out. Soil samples were also analyzed. An error analysis is included. Tables containing all experimental results and a comparison with measurements of previous years are given. The authors concluded that at the time of the study (dry season) the lake was in its homothermal phase. A high plankton concentration and a scarce ichthyological population were observed. It is also concluded that under the observed conditions, this lake is not really suited as a fishing ground during that season.

**PB-298 083/7** PC A04/MF A01  
Agency for International Development, Washington, DC.  
**Country Development Strategy Statement, FY 1981. Ghana**  
Jan 79, 57p

Descriptors: \*Economic development, \*Foreign aid, \*Ghana, Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning.  
Identifiers: Developing country application, Agency for International Development.

The document outlines the economic situation in Ghana and development plans of the Ghana Government. Part I of this study gives an analytical description of the poor. Part II gives the strategy and Part III the assistance planning levels. This strategy statement has been prepared by the AID field mission. It is prepared annually and used for planning purposes in the field and in Washington.

**PB-298 084/5** PC A03/MF A01  
Agency for International Development, Washington, DC.  
**Country Development Strategy Statement, FY 1981. Philippines**  
Jan 79, 39p

Descriptors: \*Economic development, \*Foreign aid, \*Philippines, Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning.  
Identifiers: Developing country application, Agency for International Development.

The document outlines the economic situation in the Philippines and development plans of the Philippines Government. Part I of this study gives an analytical description of the poor. Part II gives the strategy and Part III the assistance planning levels. This strategy statement has been prepared by the AID field mission. It is prepared annually and used for planning purposes in the field and in Washington.

**PB-298 085/2** PC A04/MF A01  
Agency for International Development, Washington, DC.  
**Country Development Strategy Statement, FY 1981. Indonesia**  
Jan 79, 67p

Descriptors: \*Economic development, \*Foreign aid, \*Indonesia, Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning.  
Identifiers: Developing country application, Agency for International Development.

The document outlines the economic situation in Indonesia and development plans of the Indonesian Government. Part I of this study gives an analytical description of the poor. Parts II and III give the strategy and cites the assistance planning level. This strategy statement has been prepared

by the AID field mission. It is prepared annually and used for planning purposes in the field and in Washington.

**PB-298 090/2** PC A04/MF A01  
Agency for International Development, Washington, DC.  
**Country Development Strategy Statement, FY 1981. Bangladesh**  
Jan 79, 68p

Descriptors: \*Economic development, \*Foreign aid, \*Bangladesh, Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning.  
Identifiers: Developing country application, Agency for International Development.

The economic structure of Bangladesh is discussed as well as the measures planned by the Government to improve the situation. AID objectives are outlined to assist in upgrading the general economic picture. This strategy statement has been prepared by the AID field mission. It is prepared annually and used for planning purposes in the field and in Washington.

**PB-298 091/0** PC A03/MF A01  
Agency for International Development, Washington, DC.  
**Country Development Strategy Statement, FY 1981. Pakistan**  
Jan 79, 50p

Descriptors: \*Economic development, \*Foreign aid, \*Pakistan, Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning.  
Identifiers: Developing country application, Agency for International Development.

The document outlines the economic situation in Pakistan and presents the AID program strategy for this country. It is prepared annually and used for planning purposes in the field and in Washington.

**PB-298 092/8** PC A04/MF A01  
Agency for International Development, Washington, DC.  
**Country Development Strategy Statement, 1981-1985. USAID/Kenya**  
Jan 79, 60p

Descriptors: \*Economic development, \*Foreign aid, \*Kenya, Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning.  
Identifiers: Developing country application, Agency for International Development.

The document outlines the economic situation in Kenya and development plans of the Kenya Government. Part I of this study gives an analytical description of the poor. Part II gives the strategy and Part III cites the assistance planning level. This strategy statement has been prepared by the AID field mission. It is prepared annually and used for planning purposes in the field and in Washington.

**PB-298 117/3** PC A05/MF A01  
Agency for International Development, Washington, DC.  
**Country Development Strategy Statement, FY 1981. Thailand**  
Jan 79, 100p

Descriptors: \*Economic development, \*Foreign aid, \*Thailand, Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning.  
Identifiers: Developing country application, Agency for International Development.

The document outlines the economic situation in Thailand and development plans of the Royal Thai Government. The second and third portion of this study outline the AID program strategy for this country. This strategy statement has been prepared by the AID field mission. It is prepared annually and used for planning purposes in the field and in Washington.



**PNL-2521** PC A06/MF A01  
Battelle Pacific Northwest Labs., Richland, WA.  
**Siting Handbook for Small Wind Energy Conversion Systems**  
H. L. Wegley, M. M. Orgill, and R. L. Drake. May 78, 118p  
Contract EY-76-C-06-1830

Descriptors: \*USA, \*Wind power, \*Wind turbines, Availability, Site selection, Topography.  
Identifiers: ERDA/170604, ERDA/170100.

The primary purpose of this handbook is to provide siting guidelines for laymen who are considering the use of small wind energy conversion systems. With this purpose in mind, the handbook is being published in its current form to provide basic strategies to users as early as possible. The handbook will soon require updating due to rapidly changing technology and the evolving needs of users. Consequently, the authors also intend for this edition to serve as a review copy prior to wider distribution. (ERA citation 03:052367)

**RFP-2841/1270/78/4** PC A11/MF A01  
Nielsen Engineering and Research, Inc., Mountain View, CA.  
**Wind Power for Farms, Homes, and Small Industry**  
J. Park, and D. Schwind. Sep 78, 229p  
Contract EY-76-C-03-1270, EY-76-C-04-3533

Descriptors: \*Wind power, \*Wind turbines, Availability, Economics, Feasibility studies, Legal aspects, Site selection, Specifications.  
Identifiers: ERDA/170000, ERDA/299003.

Information is presented concerning basic wind turbine energy conversion; wind behavior and site selection; power and energy requirements; the components of a wind energy conversion system; selecting a wind energy conversion system and system economics; and legal aspects. (ERA citation 04:018648)

**SAN/1122-76/1** PC A13/MF A01  
Atlas Corp., Santa Clara, Calif.  
**Description of the Solar Energy R and D Programs in Many Nations. Final Report**  
F. de Winter, and J. W. de Winter. Feb 76, 298p  
Contract E(04-3)-1122

Descriptors: \*Solar energy, Research programs.  
Identifiers: ERDA/140000, Foreign countries.

The present report includes descriptions of the Solar Energy R and D Programs of 32 countries, of the Organization of American States, of UNESCO, and of a number of private organizations. The descriptions were solicited from the most reliable representatives known for the individual countries, and were received between late July 1975 and February 1976. (ERA citation 01:025543)

**SAN/1220-1** PC A12/MF A01  
General Electric Co., Philadelphia, Pa. Space Div.  
**Application of Solar Energy to the Supply of Hot Water for Textile Dyeing. Final Report, CDRL/PA 10**  
Sep 77, 265p  
Contract EY-76-C-03-1220

Descriptors: \*Solar process heat, \*Solar water heaters, \*Textile industry, Data acquisition, Design, Diagrams, Dyes, Economics, Energy consumption, Feasibility studies, Industrial plants, Medium vacuum, Performance, Planning, Sensible heat storage, Solar collectors, Specifications, Tanks, Textiles, Water.  
Identifiers: ERDA/140905, \*Process heat, Solar water heating, Hot water heating, Industries.

The design plan for a solar process hot water system for a textile dye beck at Riegel Textile Corporation's LaFrance, South Carolina, facilities is presented. The solar system consists of 396 GE model TC 100 evacuated tube collector modules arranged in a ground mounted array with a total collector area of 6680 square feet. The system includes an 8000-gallon hot water storage tank. Systems analyses, specification sheets, performance data, and an economic evaluation of the proposed system are presented. (ERA citation 03:021360)

**SAND-75-0530** PC A03/MF A01  
Sandia Labs., Albuquerque, N.Mex.  
**Engineering of Wind Energy Systems.**  
J. F. Banas, and W. N. Sullivan. Jan 76, 27p  
Contract AT(29-1)-789

Descriptors: \*Wind turbines, Performance, Comparative evaluations, Configuration, Efficiency, Electric power, Power generation.  
Identifiers: ERDA/170602, ERDA/170603, Wind power generation.

The engineering of wind energy systems is analyzed from the point of view of component selection and performance assessment. Combinations of two load types (variable and constant speed) and three turbine types connected by a fixed-gear-ratio transmission constitute the various systems investigated. The three turbine types result from introducing the notions of nested, unnested, and hybrid power coefficients suggested by current performance characteristics of American Multiblade, Darrieus, and Darrieus/Savonius turbines. The engineering problems associated with these systems are discussed qualitatively, emphasizing the nature, magnitude, and variability of the problems. 11 references.

**SERI-36** PC A04/MF A01  
Solar Energy Research Inst., Golden, CO.  
**Small Power Systems Study. Quarterly Report No. 1**  
J. P. Thornton, C. J. Bishop, K. C. Brown, and A. L. Edgecombe. 1 Jul 78, 54p  
Contract EG-77-C-01-4042

Descriptors: \*Solar thermal power plants, Comparative evaluations, Cost, Performance, Power range 1-10 mw, Remote areas, Rural areas, Solar collectors.  
Identifiers: ERDA/140700, Electric power plants.

Recent studies have suggested a significant potential for small solar-thermal electric power generating plants to be used by small communities, rural areas, and remote load centers. The Small Power Systems Program has been initiated by the Department of Energy to explore the technical, economic, and institutional feasibility of small power plants. SERI, in conjunction with Jet Propulsion Laboratory and Battelle Pacific Northwest Laboratories, has been contracted by the Department of Energy to perform a comparative analysis and ranking of various solar thermal generic systems with capacities in the 1 to 10 MW/sub e/ range. The systems will be evaluated to a predetermined set of criteria which will include factors such as safety, environmental status, cost, and performance. (ERA citation 04:029633)

**SHR-0000101** PC A04/MF A01  
National Association of Counties Research Foundation, Washington, D.C.  
**Rural Human Resources Project**  
Status Rept.  
1974, 70p  
Grant OEO-30094G-73-01  
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0000101/ES.

Descriptors: \*Social services, \*Multistate government, State government, Relationship, Private organizations, National government, Methodology, Management, Local government, Integration, Coordination.  
Identifiers: Counties, Alabama, Arkansas, Iowa, Minnesota, Montana, New York, Oregon, Pennsylvania, \*Rural areas.

A quarterly progress report presented by the National Association of Counties Research Foundation provides descriptions of current activities of the Rural Human Resources Project, designed to help rural counties respond to the human services needs of their citizens. Participating in the project are the State association of counties in Alabama, Arkansas, Iowa, Minnesota, Montana, New York, Oregon, and Pennsylvania. Part One presents an overview of the eight-State project with emphasis on the development of closer ties between the State associations of counties and local community action agencies. Human services integration at the county level is discussed, together with a de-

scription of the roles played by the new staff position added by each State association -- human resources coordinator, and presents individual status reports for each participating State. These reports describe the conditions under which human services are delivered in each State, the principal objectives of each State's project, and current progress. Human resources coordinators for the project are listed by name and address.

**SHR-0001658** PC A07/MF A01  
Office of Human Development, Washington, D.C.  
Office of Rural Development.  
**Getting Human Services to Rural People**  
Final Rept.  
Jun 76, 147p Rept no. HEW/ORD/DC-76/06  
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0001658/ES.

Descriptors: \*Social services, \*Rural areas, \*Delivery, Services, Service related organizations, Regulations, Program financing, Position(Location), Population migrations, Planning, Outreach, Organizing, Organizations, Organization theory, Operations, Methodology, Management, Management systems, Local government, Legislation, Integrated services, Input, Inadequacies, Government, Financing, Federal aid, Evaluation, Effectiveness, Coordination, Consumers, Constraints, Community relations, Communicating, Clients, Capacity, Capabilities, Agency role, Abilities.

The results of field evaluations of 11 rural human services projects are reported, barriers to the delivery and receipt of services in rural areas are identified, and implications for action by DHEW are discussed. The projects visited, nine of which received DHEW funds, operated within generally similar contexts: rural agricultural communities with dispersed populations and high levels of poverty. However, the projects varied considerably in the number and type of services provided and in the primary target groups served. A strongly constituted board of directors was found to be one good indicator of a strong project. Projects with broadly defined target groups and diverse goals appeared weaker than those with narrower target groups and well defined, integrated goals and objectives. All projects expended high levels of effort on obtaining funding. Recognition of the need for interagency cooperation was widespread. Planning and evaluation components were generally weak. Barriers to effective delivery of DHEW services in rural areas include transportation problems, lack of information about rural projects, limited flexible funding and staff capacity at the local area, and attitudinal problems, as exemplified in the common belief that DHEW's involvement in rural affairs is inappropriate. It is recommended that a long-range national strategy for rural development be established and that a commitment be made to providing dollar and manpower resources for overcoming imbalances between rural and urban America. Case studies are presented for 8 of the 11 projects visited.

**SHR-0002289** PC A04/MF A01  
Bay Cove Community Mental Health Center, Boston, MA.  
**Needs Assessment: A Working Manual**  
Phyllis Q. Schmitt. 19 Oct 77, 64p

Descriptors: \*Requirements, \*Social services, \*Statistical data, Analyzing, Assessments, Characteristics, Clients, Confidentiality, Data acquisition, Data processing, Data, Demography, Forecasting, Information, Input, Management systems, Management, Mathematical analysis, Measurement, Methodology, Planning, Simulation.

This manual presents a multilevel, multisource approach to needs assessment, from which the reader may choose methods within his / her capabilities and interests. Each chapter contains a series of approaches in gathering and handling data, beginning with the simplest and ending with the most complex. The initial chapter covers use of objective measures which already exist (census data) or which can be compiled (record search material). Discussion then proceeds to methods of obtaining expert opinion from community leaders. Several methods of conducting a 'felt need survey' to collect data are described. Alternative ways of



obtaining information from the target population, the group who already has or has had problems with the entity under study, are also presented. Finally, a plan for action summarizes the monograph, including a hypothetical example of a needs assessment survey. The example illustrates the combination of the foregoing methods. A number of sections stress the importance of the confidentiality of information where it could be injurious or embarrassing to the community. Brief illustrations serve as simple working examples of principles discussed in the text. Exhibits are included for users of the manual to serve as prototypes in creating their own charts and graphs. Textual references and the table of contents direct the reader to these aids. Portions of this document are not fully legible.

**SHR-0002560** PC A03/MF A01  
Health and Welfare Council, Inc., Media, PA.  
**Needs Assessment in Community Planning: An Evaluation of Ten Approaches**  
Feb 78, 30p

Descriptors: \*Assessments, \*Requirements, \*Social services, Agency role, Cases, Clients, Communicative, Community relations, Consumers, Coordination, Core services, Delivery, Direct services, Feedback, Flow control, Followup contacts, Followup, Forecasting, Input, Intake, Integration, Interactions, Interrelationships, Management systems, Management, Measurement, Methodology, Organizing, Planning, Program effectiveness, Reasons, Services, Social indicators, Statistical data.

Needs assessment remains the most fundamental aspect of any human services program. Poor evaluations of many programs result from errors made during the needs assessment phase of the program planning process. Needs assessment is the process of identifying and describing individual, family, or community conditions that may be amenable to total or partial amelioration through a human services program. Information gathered in needs assessment studies is used to set goals, program objectives, and priorities, and thus, influences the effectiveness of service delivery. By documenting problems, it justifies the development and implementation of a specific program. In the same vein, it determines the continuing validity of the goals, objectives, and services of an existing program. This pamphlet, distributed by the Health and Welfare Council, attempts to give a general introduction to needs assessment through a pragmatic examination of ten methods commonly used by planners and program developers. The techniques examined include: (1) the community survey; (2) the experience survey; (3) the available data approach; (4) the resource inventory; (5) the consumer demand approach; (6) the outreach approach; (7) public hearings and forums; (8) demonstration projects; (9) social indicators; and (10) beneficiary analysis. Exploration of the concept of needs shows that community service needs can be viewed as either manifest (clearly evident) or latent (felt to be present). The former is broken down into expressed and felt needs, while the latter is divided into inferred, ascribed, and comparative needs. Each technique is evaluated in terms of its ability to assess each of these categories of community needs.

**SRO-888-1** PC A04/MF A01  
Georgia Univ., Athens.  
**Multidisciplinary Research Program Directed Toward Utilization of Solar Energy Through Bioconversion of Renewable Resources. Progress Report**  
W. R. Finnerty. Jul 76, 73p  
Contract E(38-1)-888

Descriptors: \*Solar energy conversion, \*Trees, Resins, Biosynthesis, Clone cells, Growth, Herbicides, Phenotype, Plant stems, Research programs.  
Identifiers: ERDA/140504, ERDA/550400, ERDA/551000, ERDA/550200, ERDA/090100, Plants(Botany), Genetics.

Progress is reported in four research areas of solar bioconversion. The first program deals with the genetic selection of superior trees, physiological basis of vigor, tissue culture, haploid cell lines, and somatic hybridization. The second deals with the

physiology of paraquat-induced oleoresin biogenesis. Separate abstracts were prepared for the other two program areas: biochemical basis of paraquat-induced oleoresin production in pines and biochemistry of methanogenesis. (ERA citation 02:000461)

**TID-22781** PC E02/MF A01  
Battelle Columbus Labs., OH.  
**Fuels from Sugar Crops: Systems Study for Sugarcane, Sweet Sorghum, and Sugar Beets**  
R. A. Nathan. Jul 78, 148p

Descriptors: \*Ammonia, \*Ethanol, \*Sorghum, \*Sugar beets, \*Sugar cane, Acetic acid, Biosynthesis, Cultivation techniques, Economics, Feasibility studies, Fermentation, High btu gas, Information needs, Methanol, Recommendations, Reviews, Synthesis, Synthesis gas, Technology assessment, Thermochemical processes.  
Identifiers: ERDA/090222, ERDA/090320, ERDA/140504, Manufactured gas, Synthetic fuels, Anaerobic processes.

An extensive analysis is made of the technical and economic feasibility of producing fuels and chemicals from the sugar crops (sugar cane, sweet sorghum, and sugar beets). It is concluded that ethanol and ammonia are the most promising products. Ethanol produced by fermentation on juice or molasses is close to economic competitiveness. The ammonia cost is not yet competitive but could be competitive with coal-produced ammonia. Sugar cane appears to be the most promising crop in the short and intermediate term; sweet sorghum has the greatest long-range appeal. The development of processes to manufacture ammonia, methanol, acetic acid, and thermochemical substitute natural gas (SNG) from sugar crop residues depends on technology to generate synthesis gas. Anaerobic digestion of sugar cane or juices to SNG is not attractive on economic grounds. The agricultural aspects of sugar crops research are summarized. Energy balances of input/output are derived for sugar cane and sugar beets. Recommendations are made for USDOE actions and policy decisions. (ERA citation 04:002696)

**TID-26786** PC A03/MF A01  
Auburn Univ., Ala.  
**Potential for Conversion and Utilization of Solar Energy in Poultry Production. Progress Report Covering the Period from September 15, 1974 to January 31, 1975.**  
R. N. Brewer, and J. R. Dunn. 28 Jan 75, 34p

Descriptors: \*Agriculture, \*Energy demand, \*Solar energy, Agriculture, Fowl, Production.  
Identifiers: ERDA/140901.

For abstract, see NSA 7504

**TID-26889** PC A04/MF A01  
Puerto Rico Nuclear Center, San Juan.  
**Evaluation of the Emery Dredge for Determining Numbers of Snails in Tropical Reservoirs.**  
W. R. Jobin, and F. F. Ferguson. 1973, 56p

Descriptors: \*Snails, \*Abundance, \*Pest control, \*Planning, \*Schistosomiasis, \*Puerto rico, Populations, Sampling, Water reservoirs.  
Identifiers: ERDA/520100.

Since control of the aquatic snails which transmit schistosomes can be very expensive in large hydroelectric and irrigation reservoirs, it is important to understand precisely the dynamics of these snail populations in order to plan efficient programs for their control. Thus sampling methods are needed to measure the numbers of snails in the reservoirs and this report concerns the use and evaluation of the Emery dredge in nine reservoirs in Puerto Rico. The results showed that the Emery dredge could be utilized under certain conditions to accurately estimate numbers of snails in these reservoirs. In addition field results showed that Biomphalaria glabrata could be stranded by water receding very slowly and that they were highly resistant to desiccation. These results are important for planning snail control through periodic fluctuation of the water level.

**TID-27032** PC A07/MF A01  
Battelle Columbus Labs., Ohio.  
**Systems Study of Fuels from Sugarcane, Sweet Sorghum, and Sugar Beets. Third Quarterly Report**  
E. S. Lipinsky, R. A. Nathan, W. J. Sheppard, W. T. Lawhon, and J. L. Otis. 14 Apr 76, 149p

Descriptors: \*Baile process, \*Beets, \*Purox pyrolysis process, \*Sorghum, \*Sugar cane, Anaerobic digestion, Ethanol, High btu gas, Intermediate btu gas, Production, Pyrolysis, Research programs, Solar energy conversion, Synthesis gas.  
Identifiers: ERDA/090100, ERDA/140504, \*Cellulose, \*Biological energy conversion, \*Synthetic fuels.

The primary objective of this study is to suggest methods to derive fuels economically from sugar cane, sugar beets, and sweet sorghum, evaluate the potential feasibility of the various suggestions, and to suggest means to convert the potential feasibility into practical feasibility. The sugar cane and sugar beet productivity per acre and the production costs are estimated. Sugar cane is suitable for tropical and subtropical climates, whereas the sugar beet can be grown in temperate climates. The two most promising methods for the thermochemical conversion of the plants into synthesis gas are the Baile and the Purox process. Anaerobic conversion of sugar crop fiber into SNG has not yet been subjected to extensive laboratory investigation, but it is expected that pretreatment would probably be needed to improve the rate of digestion of the lignocellulosic fiber. (ERA citation 01:018855)

**TID-27060** PC A02/MF A01  
Energy Research and Development Administration, Washington, D.C. Div. of Buildings and Industry.  
**State Research Priorities for Energy Conservation in Buildings and Agriculture**  
1975, 18p

Descriptors: \*Energy conservation, \*Meetings, Agriculture, Buildings, Economics, Fertilizers, Natural gas, Production, Reviews, Solar energy conversion, Synthetic fuels, Thermal insulation, US ERDA.  
Identifiers: ERDA/320100, ERDA/320300.

Highlights are given of Federal and State presentations at a conference on research priorities for energy conservation in buildings and agriculture held in Chicago on Oct. 20, 1975. The conference was sponsored jointly by US ERDA and the National Governor's Conference. The five top priority categories recommended by the States for Federal R and D related to energy conservation in buildings were: insulation materials; technology transfer; economic factors; solar heating and cooling; and construction techniques. The top priority items recommended for research on energy conservation in agriculture were: development of substitute fuels for natural gas; improved fertilizer production processes; energy production from wastes; more efficient crop-drying techniques; and more efficient food- and fiber-processing methods. (ERA citation 01:023564)

**TID-27164** PC A15/MF A01  
Cornell Univ., Ithaca, N.Y.  
**Bioconversion of Agricultural Wastes for Pollution Control and Energy Conservation. Final Report**  
W. J. Jewell, H. R. Davis, W. W. Gunkel, D. J. Lathwell, and J. H. Martin, Jr. Sep 76, 341p  
Contract ERDA-NSF-741222A01

Descriptors: \*Manures, \*Methane, Air pollution, Anaerobic digestion, Biosynthesis, Economics, Energy conservation, Feasibility studies, Land pollution, Water pollution.  
Identifiers: ERDA/090122, ERDA/140504, ERDA/295000, \*Agricultural wastes, Air pollution control, Water pollution control.

The combination of concerns for energy shortages and pollution control has renewed interest in the possibility of generating energy from organic wastes. This report is a comprehensive study of the feasibility of generating a substitute natural gas on U. S. dairies (40 and 100 cows) and beef feed-



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lots (1000 head) using the anaerobic fermentation process. The feasibility in technical, economic and practical terms is estimated. Excluding energy use in manufacture of equipment and farm chemicals, the total energy use on 40 and 100 cow dairies, and 1000 head feedlots were estimated to be 164 x 10 exp 6, 307 x 10 exp 6, and 670 x 10 exp 6 kcal per year, respectively. The estimated maximum annual methane energy that could be generated on these operations was estimated as 216 x 10 exp 6, 473 x 10 exp 6, and 2280 x 10 exp 6 kcal, respectively. Thus, a dairy farm in northern New York could produce more energy than it consumes, and a feedlot could produce more than 3 times the quantity consumed. The estimated costs of generating methane on 40 and 100 cow dairies and on a 1000 head beef feedlot were \$22.80, \$13.40, and \$4.50 per 10 exp 6 kcal. Detailed analyses of the three operations estimated that the actual costs for utilization would increase to \$80, \$39, and \$11 per 10 exp 6 kcal for specific operations, respectively. Farms with more than 100 cows can begin to consider the technology as an income producing operation. It is therefore concluded that anaerobic fermentation of agricultural wastes has significant potential and should receive increased attention. (ERA citation 02:021947)

**TID-27205** PC A03/MF A01  
Ohio State Univ., Columbus.  
**Leaf Decomposition in a Tropical Rainforest Stream**  
D. E. Padgett. 1975, 48  
Contract E(40-1)-GEN-33  
Thesis.

Descriptors: \*Forest litter, \*Fungi, Aquatic ecosystems, Biochemical reaction kinetics, Decomposition, Ecology, Forests, Puerto rico, Streams, Tropical regions.  
Identifiers: ERDA/520100, ERDA/550200, Aquatic microbiology, \*Hyphomycetes.

Fungi play an important part in leaf litter decomposition in terrestrial ecosystems in both temperate and tropical regions. There are few published reports dealing with decomposition in running waters, and no work has been done in tropical streams. Results are reported from a study undertaken to determine the nature and time course of disappearance of submerged leaf litter in a small stream of a forest in northwestern Puerto Rico, with emphasis on elucidating decompositional activity of aquatic hyphomycetes. (ERA citation 02:018251)

**TID-28044** PC A14/MF A01  
Energy Research and Development Administration, Washington, D.C.  
**Guide to Demonstrations of Energy Conservation, Solar Energy and Other New Technologies: Energy Extension Service**  
N. Ignatius. Sep 77, 307p

Descriptors: \*Agriculture, \*Buildings, \*Commercial buildings, \*Energy conservation, \*Geothermal energy, \*Houses, \*Industrial plants, \*Process heat, \*Solar cell arrays, \*Solar cooling systems, \*Solar heating systems, \*Solar water heaters, \*Wind power, \*Manuals, Biomass, Demonstration programs, Farms, Greenhouses, Office buildings, Passive solar heating systems, Planning, Residential sector, School buildings, Solar air conditioning, Solar energy, Solar heating, Solar space heating, Underground, USA.  
Identifiers: ERDA/299000, ERDA/291000, ERDA/320100, ERDA/140900, ERDA/140501, Subsurface structures.

This guide was compiled by the Energy Extension Service (EES) for use by State EES planners. It is intended to facilitate viewing of solar, conservation, and other energy technologies at work. The demonstrations listed in this Guide have generally been limited to those most applicable to individual homeowners, small businesses, schools, and farms. In a few states, however, municipal systems have also been included. Many of these projects have received Federal funding. The majority of projects demonstrate some form of solar energy. In addition to solar heating and cooling for homes and commercial buildings, a number of examples of farm applications such as solar crop drying are listed, as well as demonstrations of wind energy,

biomass, photovoltaics, etc. Since all successful solar heating and cooling systems incorporate sensible energy-conserving design, each solar heating and/or cooling project is at the same time an energy-conservation project. When these conservation designs are of special interest or inventiveness, this has been noted. In a few cases, projects demonstrate only conservation measures, such as the construction of buildings underground. (ERA citation 03:018509)

**TID-28550** PC A05/MF A01  
Florida Univ., Gainesville. Inst. of Food and Agricultural Sciences.  
**Sugarcane Production Residues: Technologic and Economic Assessment of Methods for Conversion to Utilizable Energy Forms. Final Report**  
R. A. Nordstedt, P. H. Smith, L. O. Bagnall, and F. le Grand. 1976, 82p

Descriptors: \*Anaerobic digestion, \*Bagasse, Combustion, Pyrolysis, Comparative evaluations, Economics, Florida, Inventories, Methane, Pyrolytic oils, Steam generation, Technology assessment.  
Identifiers: ERDA/090400, ERDA/090122, ERDA/140504, \*Refuse derived fuels, Feasibility, Solid waste disposal, Synthetic fuels, Manufactured gas.

This report examines the technologic and economic feasibility of converting sugarcane production residues in South Florida to utilizable energy forms. Quantity and location of the residues are given. Current uses of the residues are outlined and compared with other potential uses which are described in the literature. Technological problems in collection of the field residues are discussed. The resulting research and development needs are outlined. An in-depth economic comparison of anaerobic digestion, shaft pyrolysis, and waterwall incineration is presented. Economic feasibility of each of the three processes is presented as a function of plant size using current market prices for energy and the energy price increases which would be necessary to make each of the processes economically feasible. (ERA citation 04:007640)

**TID-28552** PC A07/MF A01  
Battelle Pacific Northwest Labs., Richland, WA.  
**Technical and Economic Assessment of Methods for Direct Conversion of Agricultural Residue to Usable Energy. Final Report**  
R. C. Bailie. 20 Oct 76, 136p

Descriptors: \*Agricultural wastes, \*Ethanol, \*Low btu gas, \*Methane, Acid hydrolysis, Anaerobic digestion, Biosynthesis, Chemical reactors, Comparative evaluations, Feasibility studies, Fermentation, Fischer-tropsch synthesis, Flowsheets, Hydrogenation, Mesophilic conditions, Production, Pyrolysis, Tables, Thermophilic conditions, Time dependence.  
Identifiers: ERDA/140504, ERDA/090122, ERDA/090222, Manufactured gas, Synthetic fuels, \*Solid waste disposal, Forecasting, Refuse derived fuels.

Various methods for conversion of agricultural wastes to usable energy were evaluated for further consideration for user operated and commercially operated systems. Advantages and disadvantages of anaerobic digestion and low Btu gas pyrolysis, the only two alternatives that were considered to be worthy of evaluation for user operated systems, are discussed. Both systems were also considered feasible for use with commercially operated systems. In addition, two liquid product systems, hydrolysis and fermentation to ethanol and medium Btu gas pyrolysis followed by Fischer-Tropsch reaction to form a liquid product, were evaluated. (ERA citation 04:018341)

**TID-28736** PC A03/MF A01  
New York State Coll. of Agriculture and Life Sciences, Ithaca.  
**Anaerobic Fermentation of Agricultural Residues: Potential for Improvement and Implementation. Eight Quarter Progress Report, March 16--June 15, 1978**  
W. J. Jewell. 1978, 29p  
Contract EY-76-S-02-2981

Descriptors: \*Chemical reactors, \*Manures, \*Methane, Anaerobic digestion, Biosynthesis, Performance, Research programs.  
Identifiers: ERDA/090122, ERDA/140504, \*Agricultural wastes, Synthetic fuels, Manufactured gas, Solid wastes.

Results obtained in the development of the technical, economic, and practical feasibility of using anaerobic digestion on small-scale farms are reported. All tests are being run with dairy cattle manure. Performance data for the pilot scale random mixed fermenter and the plug flow fermenter are tabulated and briefly discussed. The construction of the full-scale plug flow fermenter and control unit is complete and the units are into the first set of operating conditions. Serious gas leakage problems have developed and steps are being taken to remedy these. (ERA citation 04:029550)

**TT-67-51301** PC A04 MF A01  
National Science Foundation, DC. Special Foreign Currency Science Information Program.  
**Importance of Trace Elements in Chernozem Soils under Conditions of Dry Farming, and Their Influence on the Physiological Processes Determining the Drought-and Heat-Resistance of Plants.**  
M. Ya. Shkolnik, and N. A. Makarova. 1968, 54p  
Rept no. SFCISI-Agr(TT-67-51301)  
Trans. of Akademiyi Nauk SSSR. Botanicheskii Institut. Trudy: Seriya IV, Eksperimentalnaya Botanika, n12 p23-73 1958.

Descriptors: \*Agriculture, Fertilizers, \*Soils, USSR, Biochemistry, Tracer studies, Soil mechanics, Boron, Moisture, Cereals, Potatoes, Rural areas.  
Identifiers: Chernozem soils.

The present work consists of two sections: the first presents the data of our investigations of the influence of trace elements on the yield and the chemical composition of plants on chernozem soils under dry-farming; the second section deals with the influence of trace elements on the physiological processes determining the drought-resistance of plants. (Author)

**TT-67-58007/2** PC A05  
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.  
**Contemporary Agriculture, Vol. 14, No. 2, 1966.**  
1967, 82p Rept no. SFCISI-Agr(TT-67-58007/2)  
Trans. of Savremena Poljoprivreda (Yugoslavia) v14 n2 1966. The above journal is translated cover-to-cover.

Descriptors: \*Agriculture, Yugoslavia, Wheat, Vegetables, Corn, Fruits, Climatology, Herbicides, Fungicides, Bovines, Rural areas.

Contents: Restoration of Deschampsietum grasslands by using different herbicides; The effect of lodging on the yield and quality of winter wheat; The effect of climatic factors on the length of the growing period and possibilities of planning the ripening dates of peas; The influence of the number of plants and their spacing in consociated corn-wheat crops on some quantitative characteristics of indian corn; The possibility of rapid regeneration of tall grape vines to achieve satisfactory yields; Control of apple powdery mildew by means of modern fungicides; Results of testing the resistance of some Yugoslav and imported inbred lines to the European corn borer; Studies in the breeding value of imported red-and-white Simmental cattle at the 'Srem' farm; Test of the two-machine system of beet digging at the 'Beograd' farm; Methods of simplifying the handling of data in tests with corn.

**TT-68-50103** PC A14 MF A01  
National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.  
**Norms and Tables for Animal Nutrition**  
Mihailo Fedorovic-Tome, Miodrag Obradovic, and Darko Stosic. 1970, 320p Rept no. SFCISI-Agr(TT-68-50103)  
Trans. of mono. Norme i Tablice za Ishranu Stoke, Belgrade, 1967 490p, by Dorde Krivokapic.



Descriptors: \*Animal nutrition, Tables(Data), Feeding stuffs, Food habits, Handbooks, Cattle, Horses, Sheep, Goats, Swine, Wildlife, Poultry, Translations, Yugoslavia, USSR.  
Identifiers: Mink, Pelts.

Contents: Nutrition norms and rations for domestic animals (Cattle feeding norms and rations, Nutrition norms and rations for swine, Nutrient requirements and rations for sheep, Nutrient requirements and rations for horses, Nutrition norms and rations for rabbits, Nutrition norms and rations for poultry); Norms, mixtures and rations as compiled by certain foreign and Yugoslav authors (Other norms and formulae for their conversion into different units, Morrison's feeding norms, American N.R.C. feeding standards, Danish standards, Norms based on the requirements of individual types and categories of animal stock for the most important nutritive substances, Norms applied in Sweden, Amino acids requirements for swine and poultry balancing rations and mixtures according to the amino acid content in feeds, Examples of evaluating feed values, rations and mixtures according to the amino acid content); Composition and nutritive value of animal feed (Methods of determining oat units, Use of the tables for composing rations and mixtures); Examples of rations and mixtures (Feed mixtures for cattle, Some American additional mixtures for cattle during finishing with roughages, Rations which can be recommended and used for the nutrition of cows in Yugoslavia according to Yugoslav authors, Rations and mixtures for swine, Rations and mixtures for poultry, Mineral mixtures for domestic animals).

**TT-68-50342** PC A16 MF A01  
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.  
**Woodworking in Estonia: Historical Survey.**  
A. Viies. 1969, 352p\* Rept no. SFCSI-Smi(TT-68-50342)  
Trans. of mono. Eesti Rahvaparane Puutoondus. Ajalooline Ulevaade, Tallinn, 1960 333p, by J. Levitan.

Descriptors: \*Wood, Material forming, \*Culture, USSR, Rural areas, Trees, Small tools, Containers, Bending, Vehicle chassis components, Roofs, Joining, Anthropology, Economics.  
Identifiers: Social anthropology, Estonia, Woodworking, Turning(Woodworking), Handicrafts, Furniture.

The document considers the importance of home industry with particular reference to woodworking, in Estonian village economy.

**TT-68-50363** PC A08 MF A01  
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.  
**Sown Winter Ranges in the Foothill Deserts of Soviet Central Asia.**  
N. T. Nechaeva, and S. Ya. Prihodko. 1968, 167p Rept no. SFCSI-Agr(TT-68-50363)  
Trans. of mono. Iskustvennyye Zimine Pastbishcha v Predgornnykh Pustynnykh Srednei Azii. (Opyt Sozdaniya Iskustvennykh Fitotsenozov), Ashkhabad, 1966 227p, by R. Karschon.

Descriptors: \*Agriculture, USSR, Deserts, Rural areas, Plants(Botany), Ecology, Economics.  
Identifiers: Area planning and development.

This book summarizes experimental work toward establishing perennial winter ranges of shrubs and half-shrubs in the foothill desert. The work deals with the dynamics of the formation of phytocenoses, their life-span, processes of regeneration and competition, and environmental effects. (Author)

**TT-70-50064** HC A12 MF A01  
National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

**Selective Breeding of Carp and Intensification of Fish Breeding in Ponds (Selektsiya Karpa i Voprosy Intensifikatsii Prudovogo Rybovodstva).**

V. S. Kirpichnikov. 1966, 254p\* Rept no. SFCSI-Int(TT-70-50064)  
Trans. of Gosudarstvennyi Nauchno-Issledovatel'skii Institut Ozerogo i Rechnogo Rybnogo Khozyaistva. Izvestiya (USSR) v61 260p 1966, by E. Hoz, and M. Yarov.

Descriptors: \*Fishes, Breeding, \*Carp, Breeding, USSR, Translations, Lakes, Rivers, Fresh water biology, Reproduction(Physiology), Ponds, Aquaculture, Fisheries.

This volume contains articles on various problems of pond pisciculture. The first section is devoted to the genetics and selection of carp. The primary aim of this collection is to state the theoretic principles of carp selection. Several articles deal with the theory of selective breeding, drawing both on the experience of Soviet scientists and on the comparatively scant non-Soviet literature on this problem. The first part of the collection also includes articles on variability of carp as well as on intraspecific and interspecific hybridization and heterosis. Articles on the organization of fish breeding in the northwestern RSFSR end the section and vindicate the policy of dividing fish breeding farms into three types: research stations, fish breeding nurseries, and commercial fish farms. The second, section of this collection consists of articles on intensification of pond pisciculture. Two studies report fish pond diseases and control measures. Konradt and Sakharov report a new commercial method of hatching larvae of carp and other thermophilic fish, involving removal of the egg from its surrounding mucous envelope and incubating it in special apparatus. The method is being tested in reservoir hatcheries and in some fish-breeding farm ponds, and offers much promise. (Author)

**TT-70-57149** PC A11 MF A01  
National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.  
**Fundamental Trends in the Evolution of Relations between Employers, Workers and Governments in Africa (Tendances Fondamentales de l'Evolution des Relations entre Employeurs, Travailleurs et Gouvernements en Afrique)**  
Charles Bokonga. 1971, 232p Rept no. SFCSI-Lab(TT-70-57149)  
Contract NSF-C466  
Trans. of Annales de droit et de Sciences Politiques (Belgium) n23 186p 1967.

Descriptors: \*Industrial relations, \*Africa, \*Labor relations, Developing countries, Labor unions, Organizations, Professional personnel, Government policies, Interactions, Management, Personnel, Surveys, France.  
Identifiers: Translations, Employers, Employees.

A panoramic survey is made of the fundamental tendencies prevailing in the relations between employers, workers, and public authorities in the African countries which have just attained independence. There would appear to be not so much a question of bettering the standard of the working class, a rather privileged class as compared to the entire population, as of bringing officials, political leaders and some entrepreneurs, to preoccupy themselves with the masses. The role of the trade unions is not reduced in this new context. (Author)

**TT-70-57224** PC A15/MF A01  
Forest Service, Washington, D.C.  
**Interaction of Wood Species in Different Types of Forests**  
D. D. Lavrinenko. 1972, 339p  
Trans. of mono. Vzyamodeistvie Drevesnykh Porod v Razlichnykh Tipakh Lesa, Moscow, 1965. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: \*Forest land, \*Forest trees, \*Wood, Cultivation, Economic development, Rotation, Plant growth, Interactions, Soil properties, Mixtures, Acclimatization, Plant genetics, Manage-

ment, Pine trees, Oak trees, Hardwoods, Translations, USSR, Topology, Handbooks.  
Identifiers: Silviculture, Forest management, Forest plantations.

The book incorporates theoretical principles of the interaction of wood species in different types of forests and makes recommendations on cultivating high productive plantations of economically important species. The following aspects have been dealt with in this work: studies on the interaction of wood species, trials in forest-steppes for developing stable plantations, typological investigations, aspects of rotation of species, and the problems of intraspecies and interspecies relationships. The author examines the relation of wood species with the environmental conditions, especially with the soil conditions, establishes the competition indices of wood plants and proves the advantage of mixed plantations over pure plantations. The author also deals with the methods of investigation and the ways of controlling the interactions of the wood species.

**TT-71-50100** PC A14/MF A01  
Department of Agriculture, Washington, D.C.  
**Handbook of Selection and Seed Growing of Oil Plants**  
V. S. Pustovoi. 1973, 310p  
Trans. of mono. Rukovodstvo po Selektii i Semenovodstvu Maslichnykh Kultur, Moscow, 1967 352p, by N. Kaner. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: \*Seeds, Selection, \*Oilseed crops, Seeds, Economic factors, Volume, Vegetable crops, Vegetable oils, Soybean plants, Peanut plants, Flax plants, Castor oil, Germination, Pollen, Hybridization, Productivity, Genetics, Translations, USSR, Handbooks.  
Identifiers: Castor bean plants, Sunflower plants, Sesame plants, Mustard plants, SFCSI.

Experimental material from the All-Union Research Institute of Oil Crops correlated in this book with data obtained from selection stations and leading farms contributes to the understanding of the theoretical and practical aspects of the selection of vegetable oil plants such as sunflower, flax, castor bean, soybean, mustard, peanut, and sesame. The authors analyze the economic significance of the crops, describe the botanical and biological properties of the plants, and present methods for the development of initial stock, the selection and evaluation of plants, and selection techniques. Strain changing, strain renewal, and the processing of experimental data are discussed. The book contains 150 tables, 17 figures, and 47 bibliographical references. (Author)

**TT-71-56014** PC A13/MF A01  
National Oceanic and Atmospheric Administration, Rockville, Md.  
**Earthquake Resistant Construction**  
S. V. Polyakov. 1973, 281p  
Trans. of Seismostoikie Konstruktsii Zdanii, Moscow, 1969 326p, by Charles Braver.

Descriptors: \*Earthquake resistant structures, Research, Dynamic structural analysis, Stresses, Vibration, Degrees of freedom, Buildings, Loads(Forces), Walls, Correlation techniques, Structural design, Seismic detection, Translations, USSR.  
Identifiers: SFCSI.

Contents:  
Some propositions of structural dynamics;  
Some general observations on earthquakes and their action on buildings;  
Determination of seismic forces;  
Classification of building construction schemes--Calculation of horizontal seismic force distribution;  
Constructions of earthquake resistant buildings.

**TT-72-50020** PC A03/MF A01  
National Marine Fisheries Service, Washington, D.C.  
**Shark Flesh in the Food Industry**  
V. S. Gordievskaya. 1973, 31p



Trans. of mono. Pishchevoe Ispolzovanie Myasa Tikhookeanskikh Akul, Vladivostok, 1971 37p, by H. Mills. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: \*Sharks, Utilization, \*Food industry, Sharks, Food processing, Meat, Nutritive value, Translations, USSR.  
Identifiers: SFCSI.

Contents:  
Size-weight and technochemical characteristics of sharks;  
Food value of shark meat, and removal of urea;  
Utilization of shark meat;  
Preserved products;  
Cured and smoked products;  
Sausages;  
The fins;  
Bibliography.

**TT-72-50055** **PC A08/MF A01**  
National Marine Fisheries Service, Washington, D.C.  
**Mass Cultivation of Invertebrates: Biology and Methods**  
I. V. Ivleva. 1973, 154p\*  
Trans. of mono. Biologicheskies Osnovy i Metody Massovogo Kultivirovaniya Kormovykh Bespozvonochnykh, Moscow, 1969 171p, by A. Mercado. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: \*Invertebrates, Cultures(Biology), \*Fishes, Feeding stuffs, Morphology, Microorganisms, Nematoda, Crustacea, Daphnia, Larvae, Growth, Distribution(Property), Translations, USSR.  
Identifiers: SFCSI.

The monograph deals with the biology and cultivation of some invertebrate species which are reared on a mass scale in the USSR: soil oligochetes; free-living nematodes; phyllopod crustaceans; daphniids; chironomid larvae. The author characterizes the biology of these species more or less uniformly, and gives a brief outline of the gross morphology. Also discussed are the following topics: distribution and relation to environmental factors; reproduction, growth, and development; population growth; feeding; chemical composition of the body; respiration. The description of culturing methods includes such basic standard data as the initial and peak density of the culture, rearing periods, the maintenance of optimal conditions, manipulations of the culture, feeds and feeding regime, and output. Methods for the maintenance of these animal groups in the laboratory are given in some cases. The book is intended for hydrobiologists, ichthyologists, and fish breeders. (Modified author abstract)

**TT-72-50070** **PC A11/MF A01**  
Bureau of Sport Fisheries and Wildlife, Washington, D.C.  
**Diseases of Pond Fishes**  
O. N. Bauer, V. A. Musselius, and Yu. A. Strelkov. 1973, 228p  
Trans. of mono. Bolezni Prudovykh Ryb, Moscow, 1969 335p, by A. Mercado. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: \*Fishes, \*Animal diseases, Fresh water fishes, Ponds, Pathology, Carp, Trout, Parasitic diseases, Infectious diseases, Aquaculture, USSR, Translations.  
Identifiers: SFCSI.

The book deals with the important infectious, parasitic and noncommunicable diseases of pond fishes. It presents new concepts of the prevention and treatment of diseases by modern means within the framework of the intensive fish breeding methods used today. The book deals not only with diseases of fish commonly occurring in the USSR, carp and trout, but also with diseases of fish imported for cultivation in ponds. Particular attention is given to the etiology, biology and epizootology of the disease agents, since knowledge in these

fields is necessary for the development of efficient methods for the control of the diseases of fish. The book is intended for veterinarians, fish pathologists and fish breeders. (Author)

**TT-73-54014** **PC A19**  
Department of Agriculture, Washington, D.C.  
**The Structure of Yarn**  
Witold Zurek. 1975, 430p  
Trans. of mono. Struktura Przedzy, Warsaw, 1971 436p, by Michal Zaorski. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: \*Yarns, \*Books, Microstructure, Physical properties, Numerical analysis, Fibers, Textile processes, Spinning, Cotton fibers, Silk, Rayon, Synthetic fibers, Translations, Poland.

The book contains physical (A) and mathematical (B) tables. Tables of the A group (physical) are meant to help designers at the selection of fibers for an intended end use. After some conclusions have been drawn with regard to the magnitude of particular characteristics (strength, or elongation of yarn), final calculations are made with the use of data referring to definite materials. Tables of the B group (mathematical) allow to determine quickly and accurately the auxiliary values (twist factor, C,D as well as z parameter necessary for calculation of strength), which are used at an appraisal of physical properties of yarn.

**UCID-17086** **PC A05/MF A01**  
California Univ., Livermore. Lawrence Livermore Lab.  
**Flat-Plate Solar Collector Handbook: A Survey of Principles, Technical Data and Evaluation Results**  
H. W. Newkirk. 29 Mar 76, 96p\*  
Contract W-7405-Eng-48

Descriptors: \*Flat plate collectors, Performance testing, Solar air conditioning, Solar space heating, Solar water heaters.  
Identifiers: ERDA/141000, ERDA/140901, Solar water heating, \*Handbooks.

This report begins with a discussion of flat plate solar collector principles. Evaluation data are presented for thirteen manufacturers of medium temperature collectors that have met the criteria: (a) intention by the manufacturer that the equipment be used only for heating and cooling buildings and for domestic hot water heating and (b) evaluation of the collector by NASA using a solar simulator as a basis for collector selection and performance prediction. (ERA citation 01:015909)

**UCID-17595** **PC A04/MF A01**  
California Univ., Livermore. Lawrence Livermore Lab.  
**Two-Week Training Program for Building Solar Thermosiphon Domestic Water-Heating Systems**  
S. Upton, and J. Costa. 31 Aug 77, 73p  
Contract W-7405-ENG-48

Descriptors: \*Solar water heaters, \*Manuals, Brazing, Construction, Education, Educational tools, Lectures, Maintenance, Pipes, Pumps, Size, Solar collectors, Solar water heating, Soldering, Testing, Thermosyphon effect.  
Identifiers: ERDA/140907, \*Specialized training.

Lecture outlines and handouts are presented for a two-week course on building a solar thermosiphon system for home water heating. The course covers solar-energy theory but focuses on practical skills required to build such a system: brazing, soldering, carpentry, sizing pipes, selecting pumps, sizing collectors, and determining domestic hot-water needs. This course is based on one taught at San Jose City College, August 8-19, 1977, for the CAL/NEVA Community Action Agency weatherization crews. (ERA citation 03:039786)

**UCLA-12-1123** **PC A02/MF A01**  
California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.

**Challenge of a Desert: Revegetation of Disturbed Desert Lands**  
A. Wallace, E. M. Romney, and R. B. Hunter. 1977, 23p Rept no. CONF-770369-1  
Contract EY-76-C-03-0012  
NAEG Pu program report meeting, Las Vegas, Nevada, USA, 2 Mar 1977.

Descriptors: \*Deserts, \*Revegetation, \*Arid lands, Biological adaptation, Climates, Economics, Genetic variability, Germination, Moisture, Plant growth, Plants, Productivity, Seeds, Terrestrial ecosystems.  
Identifiers: ERDA/510100, Shrubs, Irrigation, Trees(Plants), Grasses.

The revegetation of disturbed, arid lands is one of the great challenges of a desert. It is not an impossible task, however, if one utilizes and properly manages both the natural and the man-made resources available. Through better understanding of the processes governing revegetation and the ability to control them, it is possible for man to more rapidly restore disturbed desert lands. Terrain manipulation to form moisture catchment basins, selection of seed from pioneering shrub species, preservation of existing shrub clump fertile islands in the soil, supplemental fertilization and irrigation, and transplanting vigorous shrub species are some of the important things that can be done to help restore disturbed desert land. Some of the costs can be off-set by restoring the land to economically important trees and shrubs, or grasses, instead of back to the original vegetation. Thousands of years of historical evidence of man's survival on arid lands attest to success in meeting the challenge of the desert. (41 references). (ERA citation 03:001379)

**UCRL-Trans-11076** **PC A03/MF A01**  
**Methanol as an Energy Source and Its Synthesis**  
T. Yamamoto. 1975, 27p  
Translated from Koatsu Gasu 12 n4 p141-145 1975.

Descriptors: \*Methanol, Automotive fuels, Boiler fuel, Hydrogen production, Single cell protein, Synthesis, Town gas, Uses.  
Identifiers: ERDA/090200, Translations, Japan, \*Fuels, Production.

The processes used for the production of methanol from naphtha, natural gas, heavy petroleum, or liquefied natural gases are summarized. The use of methanol as an energy source is considered from six aspects: as a hydrogen source, as a source of city gas, for the production of reductive gas for the steel industry, as an automotive fuel, as a fuel for streaming contact combustion in boilers, and as a source of single cell protein. The use of nuclear energy for the production of methanol is briefly considered. (ERA citation 01:023013)

**UCRL-52385** **PC A04/MF A01**  
California Univ., Livermore. Lawrence Livermore Lab.  
**Design Guide for Shallow Solar Ponds**  
A. B. Casamajor, and R. E. Parsons. 6 Jan 78, 74p  
Contract W-7405-ENG-48

Descriptors: \*Solar ponds, Cost, Design, Diagrams, Operation, Size, Solar process heat, Specifications.  
Identifiers: ERDA/141000.

The Solar Energy Group at LLL has developed shallow solar ponds to supply solar-heated water for industrial and commercial use at a cost that is competitive with conventional energy sources. Three aspects of this SSP technology are discussed: (1) an introduction to SSP technology, potential, and limitations; (2) a detailed description of the design and operation of an SSP system including component drawings and specifications; and (3) planning information so that an SSP system can be sized for a particular application and the cost can be estimated. (ERA citation 03:047234)

**UCRL-52385(Rev.1)** **PC A04/MF A01**  
California Univ., Livermore. Lawrence Livermore Lab.



**Design Guide for Shallow Solar Ponds**

A. B. Casamajor, and R. E. Parsons. 8 Jan 79,  
65p  
Contract W-7405-ENG-48

Descriptors: \*Solar ponds, Butenes, Cost, Design,  
Diagrams, Films, Operation, Performance, Po-  
lyethylenes, PVC, Size, Specifications.  
Identifiers: ERDA/141000.

The Solar Energy Group at LLL has developed shallow solar ponds to supply solarheated water for industrial and commercial use at a cost that is competitive with conventional energy sources. Three aspects of this SSP technology are discussed: (1) an introduction to SSP technology, potential, and limitations; (2) a detailed description of the design and operation of an SSP system including component drawings and specifications; and (3) planning information so that an SSP system can be sized for a particular applicaion and the cost can be estimated. (ERA citation 04:029707)

**UCRL-79515**

PC A02/MF A01

California Univ., Livermore. Lawrence Livermore Lab.

**Early Impact of Solar Energy Through Industrial Applications**

R. C. Maninger. 23 Jun 77, 16p Rept no. CONF-770707-1

Contract W-7405-ENG-48

Western plant engineering conference and show, Anaheim, California, United States of America (USA), 13 Jul 1977.

Descriptors: \*Solar energy, Commercialization, Information, Technology transfer.

Identifiers: ERDA/140000, Research management.

The Energy Research and Development Administration (ERDA) has established a Solar Technology Transfer Program (STTP) as an important part of the ERDA mission to promote rapid and widespread commercialization of solar energy. This program is an innovative approach to technology transfer through information dissemination and training in solar energy. This is done by means of an integrated network of regional technology agents who interact directly with multiplier groups in both the public and private sectors. Details of the program and ways of industrial participation in it are described. (ERA citation 02:051156)



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AD-A060 779/6

## AQUATIC PLANTS

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PB 287 255	Les Auxiliaires Visuels dans la Television Scolaire
PB 287 257	L'Entretien des Canaux de Drainage a Ciel Ouvert
PB 287 258	L'Importance de la Formation dans les Services Publiques
PB 289 985	Index Retrospectif: Planification et Developpement Agricoles
PB 292 950	Programme de Vivres pour la Paix: L'Alimentations des Populations
PB 293 762	Petites Entreprises: 150 Questions
PB 293 763	Formation Professionnelle: Conseils aux Maitres
PB 293 765	Petite Entreprise: Manuel de Gestion Financiere



PB 293 767	L'Elevage du Lapin
PB 293 845	Manuel Pratique de l'Equipement Rural, Vol. V: Amenagement du Foyer
PB 293 864	L'Engraissement et l'Exploitation des Bovines de Boucherie
PB 293 865	Besoins Nutritifs de la Volaille
PB 293 867	Exploitations Agricoles: Preservation des Poteaux de Cloture et des Bois de Constructions
PB 293 868	Puericulture: Les Soins aux Bebes
PB 293 869	Distribution des Eaux: Les Calcules des Prix
PB 293 870	L'Abattage des Boeufs a la Ferme
PB 293 872	Parasites Internes du Porc
PB 293 873	Petite Entrprise: La Conception des Produits
PB 293 874	Les Maladies Parasitaires du Mouton
PB 293 916	Vulgarisation Agricole: La Planification
PB 294 246	Le Systeme de Credit Agricole Cooperatif aux Etats-Units
PB 294 284	Maladies Communes et Parasites des Volailles
PB 294 285	L'Elevage des Abeilles
PB 294 286	Les Brises-Vent
PB 294 297	Manuel de Conservation du Sol
PB 294 311	LeCaste-Croute Scolaire
PB 294 344	Distribution des Eaux
PB 294 366	Puericulture: Votre Enfant de Un a Six Ans
PB 294 415	Creer et Gerer une Petite Entreprise de Construction



PB 294 419	Les Fibres Vegetales et Leurs Utilisations
PB 294 447	Une Methode Logique d'Elevage Avicole
PB 294 448	Distribution des Eaux: Les Computeurs d'Eau
PB 294 449	Distribution des Eaux: La Gestion des Services
PB 294 724	Les Clubs de la Jeunesse Rurale
PB 294 896	Manuel sur l'Emploi des Engrais
PB 294 897	L'Etude des Insects
PB 294 898	L'Exploitation Forestiere
PB 294 899	Puisard Maraicher en Beton
PB 294 900	Les Termites Ravageurs du Batiment
PB 296 916	Progres et Perspectives de la Production Alimentaire
PB 296 917	Petit Manuel de Conservation des Eaux et du Sol
PB 296 918	Les Maladies de la Tomate: Prophylaxie et Traitement



# HOW TO ORDER INFORMATION FROM NTIS

- I. If you live in a Latin American or Caribbean country, first check below to see if you qualify for free documents.

The Latin American Bureau of the United States Agency for International Development has established a special fund to subsidize the purchase of NTIS appropriate technology documents if the information will be used to benefit the poor. Those wishing to register for these document cost subsidies will be required to complete a request sheet stating explicitly how the requested appropriate technology information will be used to benefit the low-income groups in their respective countries. This cost subsidy currently pertains only to requests from countries in Latin America and the Caribbean with USAID missions. (See list below.)

To apply for the special subsidy please use NTIS APPROPRIATE TECHNOLOGY DOCUMENT REQUEST FORM or a copy of the form and send directly to:

Paul Bundick  
NTIS  
425 13th Street, N.W.  
Suite 620  
Washington, DC 20004

- II. If you do not live in one of the countries or you are not ordering this information to directly assist low income groups, you must order the information using the International Technical Information Network order form.

**See instructions for completing order form on next page.**

## COUNTRIES ELIGIBLE FOR SUBSIDY IN LATIN AMERICA & CARIBBEAN (As of October 1979)

Barbados	Guyana
Belize	Haiti
Bolivia	Honduras
Chile	Jamaica
Colombia	Nicaragua
Costa Rica	Panama
Dominican Republic	Paraguay
Ecuador	Peru
El Salvador	Surinam
Guatemala	Trinidad & Tobago



# INSTRUCTIONS FOR COMPLETING THE INTERNATIONAL TECHNICAL INFORMATION NETWORK ORDER FORM

- 1) **Date:** Fill in the month, day, and year of your request.
- 2) **Name and Address:** Fill in the name, organization, and address to which the document should be sent.
- 3) **Order Number and Title:** Fill in the titles of the desired reports and find the order/accession number (example: PB-000 000/ABC) in the upper left hand corner of each citation and enter it on the order form. Order/accession numbers must be entered for each title. If you are ordering Industry Profiles enter the subject and special order number (example: (AID-IP-66001) in the appropriate column.
- 4) **Quantity:** Enter the number of copies of each item you are ordering in paper copy (PC) or microfiche (MF).
- 5) **Price Code:** Find the price code to the right of the order number (example: PC-A03/MF A01) and enter on the form. PC = paper copy, MF = microfiche.
- 6) **Amount:** To determine the cost of each document, you must first determine the price schedule.

If there is an NTIS representative in your country (check listing on back cover), you must send your requests directly to them. They will tell you the local price of the desired information.

If there is no NTIS representative in your country, you must then determine from the information below what price schedule pertains to your country.

If you live in Canada, Mexico, or the United States, or if your country has a USAID mission, you qualify for *Price Schedule A* below. Industry Profiles for this schedule are \$3.50 each.

If you are outside North America and do not have a USAID Mission in your country, microfiche is \$5.50 per item, and all other prices are exactly *TWICE* those on *Price Schedule A*. Industry Profiles for this schedule are \$7 each. Calculate the price of each document and enter on the order form under *Amount*.

**Payment:** If you have a local representative, you may pay in local currency. If you order from NTIS directly, payment in U.S. dollars *must* accompany all orders. You may use one of the following methods of payment: Check drawn on a U.S. bank; International Money Order; International Postal Coupon; UNESCO Coupon; NTIS deposit account; or American Express. Check the box before your choice of method of payment on the order form, *enclose payment* and mail to:

National Technical Information Service  
425 13th Street N.W., Suite 620  
Washington, DC 20004  
ATTN: Mildred Johnson

## NTIS STANDARD PRICE SCHEDULE A

Price Code	Page Range	Basic North American Price	Price Code	Page Range	Basic North American Price	Price Code	Page Range	Basic North American Price	Price Code	Page Range	Basic North American Price
A01	Microfiche	\$3.50	A09	176-200	12.00	A18	401-425	21.00	A23	526-550	26.00
	Paper Copy		A10	201-225	13.00	A19	426-450	22.00	A24	551-575	27.00
A02	001-025	5.00	A11	226-250	14.00	A20	451-475	23.00	A25	576-600	28.00
A03	026-050	6.00	A12	251-275	15.00	A21	476-500	24.00	A99	601-up	-- <sup>1</sup>
A04	051-075	7.00	A13	276-300	16.00	A22	501-525	25.00			
A05	076-100	8.00	A14	301-325	\$17.00						
A06	101-125	9.00	A15	326-350	18.00						
A07	126-150	10.00	A16	351-375	19.00						
A08	151-175	11.00	A17	376-400	20.00						

<sup>1</sup>Add \$1.00 for each additional 25 page increment from 601 pages up.



# USAID/NTIS INTERNATIONAL TECHNICAL INFORMATION NETWORK ORDER FORM

## Technical Information Network Order Form

Your Reference \_\_\_\_\_

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Organization \_\_\_\_\_

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City, Country \_\_\_\_\_

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Charge my

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Signature \_\_\_\_\_

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Washington, D.C. 20004

**NAME OF REQUESTOR** \_\_\_\_\_

**ORGANIZATION** \_\_\_\_\_

**ADDRESS** \_\_\_\_\_

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## PLEASE TELL US ABOUT YOUR WORK

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# NTIS Representatives

## Barbados & The Eastern Caribbean

Caribbean Development Bank  
ATTN: Mr. Jeffrey Dellimore  
Technology Information Unit  
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